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ABSTRACT

The six issues of Wilderness Medicine Newsletter published in 1999 provide medical and rescue information for the nonphysician in remote wilderness areas. Feature articles include: "Tendinitis: Overdoing a Good Thing" (Buck Tilton); "A Sport for the Season: Trail Running" (injuries and health problems common to trail runners) (Rebecca S. Newton); "Taking the Sting Out of Anaphylaxis" (Frank Hubbell, William Kane); "A Sport for the Season: Mountain Biking" (injuries and health problems common to mountain bikers) (Rebecca S. Newton); "Clearing the Spine: A Brief Refresher" (Buck Tilton); "When a Crisis in the Wilderness Becomes a Critical Incident" (stress reactions and interventions among participants and rescue teams) (D. Craig Newton, Pat Thorney); "A Sport for the Season: Kayaking" (injuries and health problems common to kayakers) (Rebecca S. Newton); "Children Going to the Mountains" (Union Internationale des Associations D'Alpinisme); "Medical Considerations for Patient Tie-Ins" (tying a patient into a litter) (Keith Conover); "Buyer Beware: What's Getting on Your Skin?" (harmful ingredients in personal care products) (Jeff Backer); "Oh, My Aching Feet!" (common and activity-specific problems) (Jeanne Twehous); "The Joy of Socks" (Murray Hamlet); "Breathing Hard in the Backcountry" (Sue Barnes); and "People with Pre-existing Conditions Going to the Mountains" (J. S. Milledge). Issues also contain announcements of wilderness first aid and medical training, search and rescue training, conferences, publications, new products, and product problems. (SV)

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Wilderness Medicine Newsletter
FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

JANUARY/FEBRUARY1999 ISSN-1059-6518 VOLUME 10, NUMBER 1

Tendinitis: Overdoing a Good Thing

It all started innocently enough. Nights were growing longer and colder, and the cabin depended on wood for its heat. We set aside a sunny weekend to put up fuel for the winter. My job was splitting the sawn lengths into a size that would fit in the wood-burning stove. It was a fine weekend—good weather, good friends, good exercise—but Monday morning I awoke with an aching right elbow, and an attempt to flip a pancake brought a stab of hot-knife pain to the outside of the joint.

By Buck Tilton

The problem was tendinitis, specifically (in my case) "tennis elbow," and I haven't lifted a tennis racket for twenty-five years.

Almost all voluntary movement in the human body involves tendons moving across joints. Look at the inside of your wrist and make a fist. The stringy cords that you see shifting under the skin are tendons. These particular ones connect the muscles of your forearm to your wrist and fingers, allowing them to work.

Tendons are attached to muscles on one end and to bones at an insertion point on the other. On the way from muscle to bone, the tendon passes through a tendon sheath which is attached to the underlying bone. When the muscle flexes, it contracts, shortens, drawing the tendon back toward the muscle. The sheath stabilizes the tendon and acts like a pulley. Without the tendon sheath the tendon would straighten as a rope does when it is tied to a weight and pulled on by someone who wants the weight to move. The tendon sheath keeps the tendon near the bone, increasing the efficiency of the system and preventing us from looking funny when we flex a muscle.

The sheath secretes synovial fluid, the same viscous, slimy fluid that keeps joints lubricated and keeps your lungs stuck effortlessly to your chest wall while allowing the lungs to move freely when the chest wall moves.

When you've split hundreds of chunks of wood, or cast your bait hundreds of times on a day of fishing, or pulled your paddle through the water hundreds of times, a tendon may get overworked. The sheath tries to keep things running smoothly and secretes more fluid, but the sheath can't expand to hold the increase in fluid, so the tendon gets compressed. The tendon and the sheath swell and inflammation begins. Now the tendon calls for more lubrication, and the sheath responds with more fluid, and the problem multiplies each time that particular tendon is used.

Tendinitis! What a pain! Even though no tendon is immune to trouble, some parts of your body are more susceptible than others—shoulders, wrists, and elbows, for example.

In my case, the muscles of the forearm that allow the wrist to be cocked up, the muscles of wrist extension, had begun to microscopically tear loose from the outside of my elbow where the muscle attaches to the bone. This place where muscle attaches to bone is not technically a tendon since it does not run through a sheath, but the pain is similar and referred to by the same term of "tendinitis."

Another insidious form of tendinitis attacks the tendons that hold the upper arm bone to the shoulder, usually when the shoulder has been overworked in some kind of overhead activity. The tendons at the back of the shoulder rub against the underside of the shoulder blade until they are rubbed raw. You can get essentially the same result from a sudden, violent movement such as falling on an outstretched arm.

A more severe type of tendinitis can be had if you ignore the developing problem until calcium salts grow in an inflamed area. The sharp pieces of calcium irritate the bursa sac, the tough bag that surrounds all joints to keep the lubricating synovial fluid from running away. The irritated bursa starts to overproduce fluid. Eventually, the entire sac becomes inflamed and tense, and the whole joint becomes an agonizing burden to bear. At this point the standard treatment of tendinitis may not work.

The standard treatment is simple: Don't use the joint until it gets better. There is little chance it will hurt if you do not move the inflamed tendon. And, without use, the tendon will finally heal. Application of cold packs several times a day for about 20 minutes will help speed the healing by reducing the swelling, and a regimen of an over-the-counter, anti-inflammatory drug will also reduce pain and improve the rate of mending. You can also benefit from massaging the offending tendon, but rub it one way only since back and forth rubbing can cause further damage.

Like most people, I found the need to use my elbow far outweighed any chance of letting it rest. The pain and disability got worse over the next couple of months, and, in the end, my doctor was able to earn some more money off me. I received a painful cortisone injection in the joint, an injection which begins to knock down the inflammation in a few hours. For six weeks I wore a removable splint on my lower arm that prevented me from moving my wrist. I took 800 mg. of the OTC, anti-inflammatory drug, ibuprofen, three times each day. I got better.

This is what you should do. If it hurts to use a joint, especially after using it a lot, you should consider the possibility that you have tendinitis. If you probe the joint and find a point that hurts when pressed, you should know you have tendinitis. Make every effort to not use that joint for the next few days. Put a cold pack on the painful spot three or four times a day.Use the cold treatment for two or three days. After the days of cold treatment, start using the joint, but not to the point of pain. Pain-free use stimulates healthy, healing circulation while keeping the joint from stiffening. Start daily doses of an anti-inflammatant such as ibuprofen or aspirin. If the problem persists for two weeks, consult your physician. Good times are even better when you don't hurt.

Free Avalanche Information for Winter Climbers and Spring Skiers

Offered by the
New Hampshire Outdoor Council
By Peter Crane, WEMT

Anyone who hikes, climbs, or skis in New Hampshire's backcountry will want to obtain some free informational material offered by the New Hampshire Outdoor Council. The material, which focuses on the potential hazards of avalanches and how to avoid them, is being made available by the NHOC as a public service to outdoor enthusiasts. The information is designed to help make backcountry visitors more aware of some of the dangers of fall, winter, and spring travel in the wild mountain areas of the Granite State and of how proper preparation can lessen those dangers.

According to the Council, "The free information packet includes a great brochure published by the Canadian Avalanche Association which covers many topics which are as important to travelers in New Hampshire's mountain backcountry as they are to travelers to peaks north of the border. Many people who visit the White Mountains in fall, winter, and spring aren't aware of the real possibility of avalanches, especially on steep open slopes and gullies. Mount Washington, for instance, has seen ten avalanche fatalities and numerous avalanche-related accidents, which have affected hikers, technical climbers, and spring skiers." While Mount Washington may be most notorious for its hazards, the Council notes that avalanche accidents can and have occurred elsewhere in the White Mountains, too.

Along with the brochure, the Council includes a handy wallet-sized card with information provided by the United States Forest Service - White Mountain National Forest, which lists the standard classifications for avalanche hazard. The classifications are used from coast to coast in both Canada and the United States and should be recognized and understood by all who leave lowland trails and developed slopes and travel into potential avalanche terrain. The card also includes a listing of avalanche safety basics furnished by the Snow Rangers of the White Mountain National Forest, who operate an avalanche forecasting program on Mount Washington--the only such program in the eastern United States. **(Avalanche forecasts for the Mount Washington area can be obtained from 603-466-2713 ext. 4 and at www.tuckerman.org.)**

Realizing that one of the most often visited of New Hampshire's backcountry locations, Tuckerman Ravine, can also be prime avalanche terrain, the Council will include a U.S. Forest Service brochure on Tuckerman with the avalanche material. "Whether folks come to Tuckerman to hike, climb, glide, ride, or slide, they really need to be aware of the special characteristics of the Ravine, and they need to plan their trip so that it can be accomplished with enjoyment and safety," notes the Council. While most skiers wisely wait until spring for their visits to Tuckerman, as avalanche hazard in winter is often high or extreme, they should be aware that avalanche hazard can exist even in April and May.

Organizations such as schools, outing clubs, church groups, and scout troops which may include group excursions in their activities are encouraged to request multiple copies of the brochures and cards (appropriate postage should be included with such requests). The avalanche information card is also available at many outdoor outfitters in the White Mountain region.

The New Hampshire Outdoor Council is a private, non-profit organization which works with state, federal, and non-profit agencies in the state to support search and rescue activities in New Hampshire, and to promote safety and responsibility among outdoor enthusiasts in the backcountry of the Granite State so that search and rescue missions can be avoided.

For your free avalanche information packet, send a double-stamped, self-addressed envelope to:

Avalanche - Department W
NHOC
PO Box 157
Kearsarge, New Hampshire 03847

Editor's Note: Although this outreach has been tailored to populations using the backcountry of northern New England, the information provided by the NHOC is apropos to any backcountry region. With the recent and rising death toll from avalanches across the United States, Europe and farther abroad, the WMN thought our readership would find this information quite useful.

A SPORT FOR THE SEASON

Rebecca S. Newton, W-EMT

Featured in this issue:
Trail Running

Snow and ice fade into the warmth of lingering spring afternoons. For months, you've worn your old running shoes around town with a growing nostalgia for last summer's clear trails. Soon you'll be itching to get into a new season of trail exploration, to put away the skis and snowshoes for a while, to recapture the freedom that only running shoes and an unencumbered path through the woods can offer.

Whether you're a veteran off-road runner returning after a long winter away or a novice to the trail, most of your concerns will fall into four categories: breathing troubles; soft-tissue injuries; muscle, bone, and tendon problems; and environmental issues. A few basic principles will help to address these concerns before they become real problems.

A good pair of shoes, appropriate for the type of terrain you expect to run on, is crucial for preventing many of the injuries discussed below. Many companies are now specifically making—and aggressively marketing—trail-running shoes. While you don't necessarily need to splurge on a separate pair of shoes for off-road running if you've got running shoes already, be sure that any shoes you'll be using on the trail have good stability, traction, and durability. Consult running magazines, Web sites, and retailers for advice, but use your own judgement and budget to determine what kind of shoe will best match your running habits.

Perhaps the most important—and one of the most frequently neglected—defenses against running injuries is dedication to good warm-up and cool-down routines. Thorough stretching before and after a run keeps muscles limber, enabling them to handle more demand with greater finesse in future workouts. Stretching can minimize overuse pains and help to heal minor injuries. Ice and non-steroidal anti-inflammatory drugs (NSAIDs) can also help reduce swelling and pain after a tough run. Of course, good judgement regarding one's own physical abilities as well as one's environment is as crucial to preventing troubles in trail running as in any other backcountry sport.

But even fit athletes with good judgement and great shoes can suffer. What kinds of problems are common to trail runners, and what can be done about them?

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BREATHING TROUBLES

SIDE STITCHES

Side stitches are common ailments, particularly among newer runners. They cause pain in the side, generally just below the rib cage, and are the result of a spasm or cramp in the diaphragm muscle or of gas in the intestines. What many veterans of the sport have learned is that these annoyances can be prevented by a few simple measures of foresight. Perhaps most important is to avoid eating for at least one to two hours before a run. Deep breathing can also discourage side stitches by stretching the diaphragm, as can a particular technique recommended by *Runner's World* magazine: exhale forcefully as the foot opposite the stitch strikes the ground. For example, if the stitch is on your right side—the side more commonly afflicted, incidentally—exhale with a quick, strong breath each time you come down on your left foot. You may also find that stretching and massaging the affected area will help relieve the pain. If all else fails, ease off and walk or jog slowly for a bit until the stitch goes away.

ASTHMA

Another hindrance to healthy breathing is asthma, a common chronic airway disease estimated to be suffered by at least ten percent of the United States' population. An asthma attack causes contraction of the muscles surrounding air passages, narrowing of the passages themselves, and the common breathing pattern known as "wheezing"—not to mention intense anxiety in the person suffering the attack. Acute attacks can be exacerbated by dry air, cold temperature, and high altitude, and may be brought on by exercise and allergies.

In the broader view, however, exercise can be excellent for lessening the impact of asthma on your everyday life and for improving your capacity for sustained exertion. Good habits of warming up before an intense workout or race, inhaling primarily through the nose, and wearing a scarf or mask over the mouth in cold or allergy-provoking weather should help discourage attacks. Stretching or meditation sessions may help you to be able to relax quickly when an attack comes on. Many effective medications that will allow you to exercise with less interruption by illness are currently available. However, if you have asthma, you should consult your doctor for advice before beginning or modifying your exercise routine or if you notice a change in your symptoms or illness patterns.

SOFT-TISSUE INJURIES

BLISTERS

Blisters on the feet, caused by a fluid buildup under the skin at a site that has been subjected to excess friction, are a common ailment among athletes of all types. If possible, you should leave a blister alone for 24 hours to see if it disappears by itself before taking any action to heal it. If it does not go away on its own, or if you need to treat it because it cropped up halfway through your travels, you'll need to lance it. First, clean the skin on and around the affected area. With a needle or pin (sterilized by a flame, boiling water, or sterile wipe, if possible), pierce the skin at two points on opposite edges of the blister. Gently press down on the blister site with a clean tissue or gauze, slowly draining the fluid. Do not remove the overlying skin. Apply antibacterial ointment and cover the blister with a sterile bandage. If you're headed out again in the same shoes before healing is complete, cut a piece of molefoam to encircle the blister site. This will relieve pressure on the area and encourage healing by diminishing friction.

To prevent blisters, try synthetic socks—particularly the newer two-layered models—that wick moisture away from the feet. Moleskin, talcum powder, or petroleum jelly applied to the feet before a run can help discourage friction. If blisters recur, evaluate the fit of your running shoes and make sure that the shoes themselves aren't the source of your troubles.

BLACK TOENAILS

Another injury caused by contact trauma of the foot with the footwear is a black toenail, signaling blood trapped underneath the nail. This injury is the result of repeated hitting or rubbing against the top or front of the shoe as the foot strikes the ground in each stride. It is common among long-distance runners and may particularly plague trail runners who train on hilly terrain. To avoid such harmful contact, be sure to wear shoes with plenty of room in the toe box for feet to slide forward without hitting against the shoe. Make sure shoes are laced tightly enough to discourage feet from slipping forward during steep downhill stretches, but be careful not to lace shoes so tightly that they cause pain on the top of the foot.

Pain associated with a black toenail indicates that the pressure needs to be relieved by draining pooled blood from underneath the nail. If you have sustained this injury in the past, you may know how to make a hole in the nail yourself to treat the condition. Contact a physician knowl-

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JOB OPPORTUNITY

The Wilderness Medicine Institute (WMI) is seeking qualified wilderness medicine educators. WMI is the exclusive provider of the SOLO wilderness medicine curriculum in the western United States, making it part of a tradition of leadership in wilderness medicine reaching back to 1976. The WMI/SOLO certification is recognized by major outdoor programs including the National Outdoor Leadership School (NOLS) and Outward Bound.

Responsibilities:

Instruct Wilderness First Aid (WFA), Wilderness First Responder (WFR), and Wilderness EMT (WEMT) courses from mid-November through late June.

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- Two or more years teaching experience in an outdoor education setting or classroom.
- Several seasons experience leading extended trips in wilderness settings.

To Apply:

Applicants must apply for our annual Instructor Training Course. For an application contact Shana Tarter, Director of Special Projects, Wilderness Medicine Institute, PO Box 9, Pitkin, Colorado 81241. (970-641-3572 or sltsjp@rmi.net)

Application Deadline: March 15, 1999.

For more information about WMI check out our web site at
www.wildernessmed.com.

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edgeable about sports-related injuries for advice if this is the first time you've dealt with this problem or if you're squeamish about treating yourself at home. If the black toenail isn't painful or throbbing, there's no need to drain the blood. The nail will probably loosen and fall off over the course of the next few months. As a new nail comes in to replace the damaged one, guard against its becoming ingrown. Even after the loss of the original nail, though, a perfect new nail will usually return over several months' time, leaving few, if any, indications of the trauma that has occurred. Just be sure to keep the area clean as healing progresses, replacing bandages often and using antibacterial and antifungal creams to prevent infection.

CHAFING

Though injury to the foot may cause the most distress and irritation to runners, problems caused by the friction of repeated contact can occur on other parts of the body as well. Chafing is a common complaint of distance runners. Drug-store products that can diminish the effects of chafing include petroleum jelly and talcum powder, which should be applied to sensitive areas before you head out to the trail. Band-Aids or Dr. Scholl's corn cushions can also help prevent nipples from rubbing raw against a shirt during a long run. Chafing can be particularly irksome during humid summer days when clothes seem to feel continually damp. To minimize chafing, experiment with different styles and combinations of clothing. Lycra tights or shorts, worn alone or under other gear, can reduce friction on thighs. Seek out sports bras with flat or covered seams. In all seasons, choose clothing made of synthetics whenever possible.

MUSCLE, BONE, & TENDON PROBLEMS

GENERAL SORENESS

One of the most common ailments after some time away from the trail is general soreness following a particularly hard workout or a run with many downhill stretches. Even if you've stayed in shape with winter sports, some new soreness is inevitable. Once you start pushing your limits to increase your fitness and to improve your ability to navigate tough trails, you reawaken different muscle groups from those you used skiing, snowboarding, and snowshoeing during the winter months. In your new spring trail-running routine, never neglect the cool-down phase of your workout. When you're done with your run, walk for several minutes before heading back to the trailhead. If there's a stream near the trail, sit and cool your legs in the water. Stretch and massage your legs, both immediately before and after your run as well as regularly on days you don't run. Add gentle icing to your post-run stretches.

You may also use NSAIDs to reduce soreness. Just be cautious when using drugs to diminish sensation, as pain signals both damage and healing. Don't rely so heavily on NSAIDs that you can't heed your body's input about your exertions—or so heavily that you miss out on that satisfying soreness that comes from a hard-earned hill run. After a very long run (that is, in the range of 20 or more miles), take a few days off for cross-training. Cycle, swim, take a light hike. To relieve stress on the quadriceps and to decrease soreness, add downhill segments if you commonly run on flat trails and find flat stretches if too much up-and-down negotiation is what's making your muscles ache.

SHINSPLINTS AND STRESS FRACTURES

"Shinsplints" is a common name than runners give to soreness in the lower leg. It can be a hazy term, sometimes too catch-all to provide a useful evaluation of the problem, as it tends to connote a group of related but distinct lower-leg injuries. Most commonly, however, a runner complaining of shinsplints is feeling the pain associated with an inflammation of the tendons on the inside front of the lower leg. The cause of this overuse injury is straining and tearing of the tendons, brought on by the stresses of tired or inflexible calf muscles. Overpronation (see below) can also exacerbate tendon damage, as inward twisting of the foot places excess strain on the shin and knee.

Treatment for shinsplints aims to reduce the inflammation that's causing pain. Ice should be rubbed slowly along the lower leg, following the contour where muscle meets bone. NSAIDs can reduce pain and swelling. Prevention, as in most cases, is the best way to deal with the problem. Trail running itself is a preventative measure for runners who are used to road running since dirt and sand are more forgiving than asphalt and cement, easing pounding on joints and shins. Thorough calf stretches, both before and after a run, will also help prevent and treat shinsplints. If shinsplints are too painful to run through, you may need to cut back on your mileage or to take some time off to cross-train in lower-impact sports such as swimming and biking.

Though the two injuries may look deceptively similar, stress fractures are generally more serious than shinsplints. A few things can help you differentiate between shinsplints and a stress fracture of the lower leg. While the pain associated with shinsplints may fade once you've warmed up the leg muscles, the pain of a stress fracture will continue

to nag you throughout your run. Diffuse pain, sensitive to the touch and radiating down the inside of the calves along the long bone, tends to indicate shinsplints. If the pain can be pinpointed to an exact location—when you press directly on a spot, it hurts intensely, but pressing around it causes no pain—you have probably sustained a stress fracture. Stress fractures, tiny cracks disrupting the integrity of the bone surface, may radiate in the leg as your foot strikes the ground, but are generally located in the lower leg or metatarsal bones.

Stress fractures often develop as runners increase intensity and volume of training over the course of several weeks or months. You may be able to continue to run—or at least to cross-train—with a stress fracture, especially if you commit yourself to routine icing and NSAID use, but consult a sports physician for advice and get an x-ray to confirm the diagnosis.

SPRAINS

While trail running is less likely to lead to the overuse injuries so commonly caused by pavement pounding, it's much easier to sprain an ankle or tweak a knee on an uneven trail than on a roadside. Sprains can be excruciatingly painful and debilitating, but most can be walked on, at least immediately after the injury and before major swelling occurs. Examine the site of the injury. Is the joint swelling quickly? Is it discolored? Try to evaluate the severity of the damage. If you can't walk out, your options may be limited to crawling or waiting for someone else to come along to help. If the injury really is a sprain, you will probably be able to walk on it. Look around for a thick tree branch to use as a cane or crutch to support you. If you have a water source (water bottle or nearby stream or puddle), wet a bandanna or other piece of fabric to fashion a quick cooling device, and wrap it around the injury. If you have an Ace bandage or other fabric wrap (you can even use your thermal tee or extra pair of socks or some duct tape from around your water bottle), make a compression bandage.

Once you're home or able to get to some definitive source of cold, ice the injury in the initial healing phase. The goal at this point is to calm the rampant bleeding into the site that's causing swelling and impeding healthy circulation. Most sources estimate the need for treatment with ice to span the initial 72 hours following injury. After this time, you should switch to heat-based treatment, such as hot packs or a heating pad. Once the bleeding has stopped, the goal is to increase the circulation to the site in order to promote healing. Of course, throughout treatment, never apply the source or cold or heat directly to the skin. Wrap a chunk of ice in a plastic bag and towel, for example, or apply a heating pad over two layers of socks.

ACHILLES TENDINITIS AND OTHER COMMON PROBLEMS

Achilles tendinitis, an inflammation along the back of this lower-leg tendon, is characterized by pain, which may be dull or sharp, and by tightness and stiffness in the calf, which may be worst when you first get up in the morning. To soothe the pain, treat with ice and NSAIDs and repeat gentle calf stretches at least five times a day. Heel lifts in your running shoes may help, as may wearing running shoes all the time while you're suffering from a bout of Achilles tendinitis.

Many other particularly common problems among runners, as would be expected, affect the lower body, especially the feet (plantar fasciitis, heel spurs, Morton's neuroma), knees (such as runner's knee, chondromalacia, iliotibial band syndrome), and backside or backs of legs (sciatica, hamstring pain). As with so many running-related maladies, some combination of stretches, icing, rest, and NSAIDs generally represents good therapy for these sorts of problems.

Such chronic injuries are often caused or exacerbated by overpronation, an excessive rolling inward of the foot after landing, or by underpronation (also known as supination), an insufficient rolling inward of the foot upon landing. For more information on these and other similar injuries not discussed here, talk to a physician, physical therapist, or trainer who is knowledgeable about running-related injuries, or consult any of the numerous running texts written since the sport gained popularity in the 1970s and '80s. An especially popular and informative classic text is Jim Fixx's *The Complete Book of Running*, first published in 1977.

ENVIRONMENTAL ISSUES

Many of the crucial differences between first aid in trail running and first aid in most other wilderness activities can be accounted for by the fact that trail running is unlikely to be part of an overnight trip. This means that, while the sport will less often lead you deep into true wilderness than will, say, backpacking, you also tend to be far less well-prepared for emergencies while on a run than while on a longer journey.

A trail run may fill a long spring afternoon and bring

you five or more miles into the woods before you turn back. You tend to feel relatively safe—perhaps you've just parked your car at the trailhead, or perhaps you're just a few miles from home. Still, many of the environmental threats posed to all outdoorspeople face trail runners as well.

The lack of equipment carried by most trail runners can be a hazard. Vulnerability to quick changes in weather is heightened without extra clothing or shelter. A waistpack or pocket of a windbreaker, tied around your waist on a warm spring day, can hold a hat and mittens. If you're headed out on a long run, it's best to bring a small daypack with an extra layer of synthetics and a Mylar rescue blanket in case of emergency. Remember that prime hypothermia weather—in the 40s to 50s (degrees Fahrenheit) and drizzling—is also common spring and summer weather in much of the North American woods. Still, your best defense against hypothermia is water: staying well-hydrated is the best way to maintain sound judgement and healthy body temperature, whether in hot weather or cold. Of course, bring at least one water bottle if you're headed out for a run of any substantial distance. And don't forget a flashlight and a trail map.

Watch your step: the roughness of trails is what causes so many twistings of ankles and knees that could be prevented; underbrush and overhanging branches are easy to run into, poking eyes or scratching skin. If there's a substantial population of poisonous snakes where you're running, be aware of proper snakebite management and keep alert, especially when hopping logs and rocks. Whenever possible, try to see where you're about to step before you put your foot there.

As with all backcountry adventures, there's safety in numbers. Run with a friend whenever possible. Trail running is becoming a very popular activity in communities with nearby wooded areas. Check out local sports associations and running clubs where you can meet others who share your interest in off-road running. If you must run alone—whether based on your schedule or based on your desires for solitude—understand the risks you are taking, know how to take care of yourself, and let someone know where you're going and when you expect to be back. Then lace up those shoes you've been longing to wear since winter first began to fade, and get out to seek your own path once again.

This article is the second column in the new series "A Sport for the Season." Watch for upcoming installments on mountain biking and boating.

SUGGESTIONS FOR FURTHER READING:

* Amby Burfoot (editor). *Runner's World Complete Book of Running: Everything You Need to Know to Run for Fun, Fitness, and Competition*. Rodale Press, 1997.
* Joe Ellis and Joe Henderson. *Running Injury-Free: How to Prevent, Treat and Recover from Dozens of Painful Problems*. Rodale Press, 1994.
* James F. Fixx. *The Complete Book of Running*. Random House, 1977.
* James F. Fixx. *Jim Fixx's Second Book of Running*. Random House, 1980.

IS THAT AN ITIS IN YOUR BURSA, OR ARE YOU JUST GLAD TO SEE ME?

By Buck Tilton

Anywhere in your body where there's a pressure point—often near joints where tendons or muscles cross a bone or another muscle--you'll find a small, cushioning, fluid-filled sac called a bursa. Knees, elbows, and shoulders have the most important bursae, and that's where you're most likely to develop bursitis, an inflammation of a bursa with, what else, pain and swelling. It's usually the result of unusual pressure or friction, or perhaps a slight injury to the site. Prolonged kneeling on a hard surface can give it to you in the knee. The infamous problem of water-on-the-knee is almost always bursitis. Prolonged pressure of an elbow on a desk or table can punish that joint enough to cause it. It isn't uncommon for bursitis to develop as a result of rheumatoid arthritis. If someone on a wilderness trip complains of joint pain, especially in one of the major bursae areas, you might consider bursitis as part of your differential diagnoses if nothing else appears to be the cause.

RICE (rest, ice, compression, and elevation) helps most of the time, with cooling the site especially beneficial for easing the pain (as well as many others). With a few days of rest, most patients will reabsorb the excess fluid from the inflammation back into their bloodstream. A nonsteroidal anti-inflammatory drug (NSAID) such as ibuprofen can shorten the duration of the pain and swelling. Piroxicam, a stronger NSAID, is often prescribed for the pain. If the bursa grows boggy and infected, antibiotics and sometimes drainage of the fluid is required. In rare, persistent, repetitive cases, a doc might perform a relatively minor surgery to remove the bursa.

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FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

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TAKING THE STING OUT OF ANAPHYLAXIS

By
Frank Hubbell, DO & William Kane, (W)EMT

Warm weather, finally! Summer is here again. The sun is high and the days are long. For most backcountry travelers this is a time when outdoor adventuring becomes very simplified. The weight of the backpack gets cut in half as the winter equipment is retired for a season. We are able to travel much lighter on our feet. The winds of change bring a somewhat less hostile Mother Nature, and the perils of being in wild places seem non-existent. For a few, unfortunately, this is not the case. Instead, summer arrives with an anxiety over an attack by a stinging insect and the possibility of anaphylaxis.

Karla is one of those who worries. Last summer, Karla and her friend Andrew were out on a week-long canoeing trip in northern Maine. The weather was fine and the paddling, spectacular. But in mid-afternoon of the fourth day, while stopping for a lunch break on the shore, they set their packs on a ground hornets' nest. Before they realized their mistake, both had been stung.

Andrew and Karla had been stung before. Andrew had the typical reaction: a painful, raised welt that cleared up over approximately 24 hours. Karla, on the other hand, knew that she was now in a life-threatening situation. She was allergic to the venom. When she had been exposed to proteins in the venom in the past, she developed a "hypersensitivity reaction" to them.

Karla ran into the woods to avoid more stings. Andrew grabbed her pack and dug out the "bee sting kit" from a handy side pocket. Andrew could see that Karla was already breathing fast. She was agitated and very anxious. He pulled the antihistamine tablets out of the kit and immediately had her swallow them. In the moments that followed, it was obvious that the anaphylactic reaction was going to full crisis. Karla's breathing was becoming very difficult and her heart rate was increasing. Her face, neck, lips, and tongue were swelling. She was becoming cyanotic. Andrew had to assist her with the epinephrine right away.

Although some kits are spring-loaded, Karla's requires a manual injection. Inside are a complete set of printed instructions (read before a crisis--no time for reading now!) Removing the rubber cover from the needle, Andrew grasped the back of Karla's upper arm near the shoulder. He darted the needle in at a 45-degree angle as far as it would go. Pulling back slightly on the plunger, he checked to see if blood was drawn into the syringe, indicating he had hit a vein. (If he hit a vein, he would withdraw the needle and insert it again.) He pushed down on the plunger as far as it would go. As he withdrew the needle, he massaged Karla's arm to speed the drug into circulation.

In moments, Karla could breathe easier. The epinephrine would last about 20-30 minutes. The antihistamines would take 30-40 minutes to be absorbed into the body, so they would serve as "back-up" medication. She was safe for now. Occasionally the anaphylactic state will return before the tablets take

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effect. Karla's kit had a second injection of epinephrine should she need it.

What Exactly Is Anaphylaxis and How Does It Happen?

Anaphylaxis is an overwhelming allergic reaction to a protein introduced into the body. One of the most common allergens in the wilderness is bee or wasp venom; however, anaphylaxis can also result from medications, contact with food, or other forms of bites and stings. Within our bodies are a series of white blood cells (WBCs) that are constantly on the lookout for these foreign protein invaders. In order to do this, these cells must be able to distinguish between "self" and "non-self," so our own WBCs don't attack us. WBCs attack and destroy invading foreign protein. In the process they develop a "memory" of the invader so they can mobilize defense forces more quickly in the future. These additional forces are called in through the release of a chemical called histamine, released from our mast cells.

Normally, just enough histamine is released and a localized reaction occurs. Hypersensitive people release far too much histamine. Their immunological systems over-react. But why is this a threat to life?

Histamine not only helps call in reinforcements, it also causes itching, and sometimes, hives. A very powerful vasodilator, it opens blood vessels up wide all over the body and produces the risk of shock. Histamine is an equally powerful bronchoconstrictor, causing airways to close down which increases the risk of inadequate breathing.

Why Does Anaphylaxis Happen and What Does It Look Like?

It is still a mystery why some individuals develop an increased sensitivity to certain foreign proteins. An anaphylactic reaction turns skin red within minutes and causes the face and tongue to swell. Itchy hives develop. The patient experiences difficulty breathing, which gets progressively worse. The heart rate and respiratory rate increase, and the level of consciousness drops. As the reaction progresses, the patient's skin becomes pale or ashen. Eventually hypotension (low blood pressure) develops resulting in true anaphylactic shock. Without immediate care, the airway may shut completely, and the patient will die of asphyxiation.

How Is Anaphylaxis Treated?

The treatment of a potentially anaphylactic reaction begins by quickly determining any previous history of sensitivity to this type of exposure and follows with close, ongoing monitoring. Remember, the potential anaphylactic patient may have never had this level of extreme allergic response before.

SUMMARY OF ALLERGIC REACTIONS

	Signs and Symptoms	Treatment
Local	Redness; Minor Swelling at Site; Pain and/or Itchiness.	Administer a topical anesthesia or "sting-stick." Administer an oral antihistamine for additional relief from itching & swelling.
Systemic	Itchy, Red Skin; Hives appearing on body parts other than at the site of the sting signaling the reaction has become systemic; and increased capillary permeability (runny nose and eyes).	If an oral antihistamine has not yet been administered, it should be given immediately and close monitoring of the patient should continue. If the patient is advancing quickly through the sequence of signs and symptoms, the epinephrine syringe should be prepared.
Anaphylactic	Signs and symptoms of local and systemic reactions persist with swelling of face, lips, neck, and tongue; Increased heart rate and respiratory rate; Cyanosis; Hypotension; Altered Level of Consciousness; and Difficulty Breathing.	If the patient has insufficient air exchange and is becoming hypoxic (low oxygen) administer epinephrine via subcutaneous injection. Give patient 4 antihistamine tablets. Monitor patient for relapse or change. Administer second dose if signs and symptoms deteriorate prior to the anti-histamines taking effect. Continue to give 2 antihistamine tablets every 4 hours. Evacuate all patients with anaphylactic reactions.

The best compound known that will reverse the effect of the histamine is epinephrine (adrenaline). It is available, by prescription only , in pre-loaded syringes. The EpiPen (Center Laboratories) is spring-powered and requires pressing the tip against the thigh or upper arm until the spring releases, and for 10 seconds more while the epinephrine flows into the patient. The Ana-Kit (Holister-Stier) is manually operated--dart in the needle and depress the plunger.

Keep in mind that once the first dose of epinephrine has been administered, the patient isn't "out of the woods" yet. While the epinephrine is the immediate--stop-gap--treatment for the anaphylactic emergency, it needs to be backed-up by a longer lasting solution-- antihistamines. Though the Ana-Kit comes pre-packaged with antihistamine tablets, the EpiPen does not; therefore, it is wise to carry antihistamine tablets separately.

Once the epinephrine and antihistamine administration has taken place, the patient must be monitored closely for a recurrent episode. Patients who have received these drugs need to be evacuated to a medical facility where they can be observed and evaluated by a physician.

What Kind of Precautions Can Be Taken Against Anaphylaxis?

Anaphylaxis is not uncommon, and ground hornets are, obviously, not the only danger. Almost anything eaten, injected into, absorbed by, or breathed in by a person can cause an allergic reaction. People are often severely allergic to bees, wasps, yellow jackets, ants, black flies, and some food and drugs. ANAPHYLAXIS IS a TRUE EMERGENCY. As a result, hypersensitive people generally carry either an Ana-Kit or an EpiPen (both sometimes called bee sting kits).

One concern often voiced: Is it legal to give someone an injection? Yes, if the epinephrine is from their kit. But if it's your kit, and you recognize the inability to breathe indicating a severe anaphylactic reaction in someone else, err on the side of conservation of life. Leaders responsible for others in remote areas should consider attending a training session led by a physician so they can carry injectable epinephrine. Epinephrine is temperature sensitive so extreme heat and cold should be avoided. Consult your physician or medical director.

When it comes to epinephrine, knowledge is key. Before heading out on a backcountry tip, find out if anyone in the group is hypersensitive to any known substances. Learn if a group member carries epinephrine, where they carry it, and how to administer it. If a known hypersensitive person contacts the allergen to which they are hypersensitive, ready their kit. Keep all patients calm. Be thorough about checking the area where you are camping, lunching, or climbing for nests, hives, or any other trouble-inducing critters. And by all means, know what kinds of nuts and berries are lurking in that bag of gorp!

A SPORT FOR THE SEASON

Rebecca S. Newton, W-EMT

Featured in this issue:
Mountain Biking

Mountain biking injuries tend to be creatures of extremes. Among the most frequent troubles are the common scrapes and bruises that are expected in any wilderness activity. Most mountain bikers welcome the opportunity to get a little muddy, and most expect an occasional minor injury. Muscle pulls and overuse problems, too, can occur just as in any other sport. An unlucky few mountain biking trips, though, will lead to serious injury. While mountain biking tends to be faster paced than backcountry activities such as hiking and trail running, it is often done on narrower trails and on rougher terrain. These factors, combined with a risk-taking attitude sometimes caught up in mountain biking, mean that crashes, when they come, can have severe consequences. It is wise, then, for mountain biking enthusiasts to be capable of caring for their own minor injuries as well as taking care of fellow riders with potentially life-threatening problems, such as internal bleeding and central nervous system (CNS) injury.

SOFT-TISSUE INJURIES

Soft-tissue injuries--including all forms of scratches, abrasions, and tears from the trail's projecting branches and from minor falls on rough spots--are among the most common mountain biking injuries. Care for various soft-tissue injuries follows a few basic principles: in the short term, control the bleeding; in the longer term, avoid infection. Your initial approach should be to manage the bleeding with direct pressure

and elevation; these two actions combined will be effective in the majority of cases. Use of pressure points and digital pressure may also supplement your first-line care for superficial injuries. Of course, scene safety is an important consideration when skin is broken. As a caregiver, you should always implement body-substance isolation precautions, particularly gloves, if the blood is not your own. As another point of scene safety, try to stay out of the way of any nearby environmental agents that could cause new trouble either for yourself or for your patient, such as thorny branches or poison ivy.

The primary goals in longer-term care for soft tissue injuries include preventing infection and encouraging proper healing. Once bleeding has stopped, all superficial wounds should be irrigated with water. Creating a pressurized water source, by forcing water from a squeeze bottle or out of a small hole in a clean plastic bag, makes irrigation more effective. Make sure to use drinking-quality water in any treatment involving open wounds! Dirty injuries need careful debridement before covering. Careful monitoring, including keeping bandages clean and dry and changing dressings at least every 24 hours, will help discourage infection. A few signs and symptoms of infection, caused by increased blood flow and collection of white blood cells in the damaged area, are recalled by the acronym "SHARP"--swelling, heat, aching, redness, purulence (pus formation)--and will help you monitor the patient's condition. Watch also for fever, swollen lymph nodes, or streaking, all of which may indicate a spreading of infection beyond the local injury site. Backcountry treatment for infection includes gently opening a closed wound to allow drainage, encouraging use of heat packs and hot salt-water soaks, and administering antibiotics, if available. Patients with any sign of progressing infection should be brought to definitive care.

Although control of bleeding and infection are the paramount concerns, a few kinds of injuries require specific measures. Before being bandaged, punctures should be irritated to encourage slight bleeding, which will help to flush contaminants that may have been transmitted deep into the injury on the penetrating object's surface. Flap avulsions may be returned to their proper place. Impaled objects should generally be stabilized for immediate transport, though you may decide to remove the object if it compromises the airway by its location in the cheek, if it is metal and you're in a cold environment, if its presence interferes with your ability to transport the patient, or if it's in an extremity. Abrasions may be soothed by antibiotic ointment, though keeping the area clean and dry during your time in the backcountry will usually suffice to discourage infection. Bruises should be watched carefully in cold weather, since they will tend to freeze more easily than surrounding tissue. Amputated parts should be wrapped in a moist, sterile dressing and sealed in a plastic bag, which should be immersed in cold water while your patient is transported to a hospital as quickly as possible. You should consider evacuating your patient for stitches if the injury is on the face or hands or over a joint, if the cut is long and gaping, or if there seems to be an injury to a ligament, tendon, or major blood vessel.

POISON IVY IRRITATION

Since even the naked buds on early spring's leafless branches can induce contact dermatitis, poison ivy should be on your mind year-round when you step--or stumble--off the trail. The surest way to avoid this bit of flora is by learning to recognize it; the tried and true mnemonic "leaves of three, let it be" should chime in your head as you enter a wooded glade. Sticking to the trail and wearing long pants will also help you defend against irritation. If your skin contacts the plant, wash immediately with cool water and mild soap. Lotions, such as Calamine, will help calm the itch. Although even irritated skin, once cleaned, is not contagious, oils from the plant--on clothes, backpacks, bike frames--can linger for months, reafflicting you when you pull your favorite gear out of the closet for your next trip. Though most reactions to the poison ivy toxin tend to be mild, some people will have an allergic reaction so violent that they need additional drugs to calm their immune system (anaphylaxis). These patients will, naturally, require evacuation and follow-up attention.

SHOCK

While many common mountain biking injuries are superficial, injuries that occur at high speeds can have serious consequences. A collision with a trailside tree, for example, can cause internal injury leading to substantial bleeding and, potentially, to shock.

Shock occurs when the cardiovascular system, as a result of illness or injury, cannot adequately perfuse the

tissue with oxygen. Shock is one of the body's defenses against brain damage: in times of crisis, shock keeps oxygen flowing to the brain by diverting it from the rest of the body. The trouble with this survival mechanism, however, is that it quickly threatens the well-being of the extremities and the body core.

Any person who has undergone a high-speed impact should be monitored carefully for hints of such an impending crisis. Internal bleeding will be signaled by discoloration and, in the torso, by increasing abdominal rigidity and tenderness. To recognize shock, keep in mind the reasons for what the body is trying to do, and the signs and symptoms will be apparent. As with so many illnesses and injuries, a change in the patient's level of consciousness is one of the earliest signs of danger. The person may quickly become restless, anxious, and disoriented and will become unconscious in more advanced stages of shock. As the brain attempts to maintain its own blood supply, a harder-working heart will be signaled by tachycardia, while the brain's attempt to maximize the concentration of oxygen in the bloodstream will cause tachypnea. Through the effort to concentrate blood in the body's core, vasoconstriction of peripheral circulation will make the skin pale, sweaty, and cool. The patient may vomit, since the diversion of blood away from body functions that are not immediately vital won't permit digestion of stomach contents. While blood pressure will be maintained by these compensatory mechanisms for a time, an abrupt shift to hypotension indicates failing system maintenance and impending decompensation.

Shock is one of the most potentially dangerous results of an injury. In the backcountry, there are several things that caregivers can do to keep the patient as stable as can be hoped with limited resources and to buy some time to get the patient to definitive care. Of course, your first approach should be to target the source of the trouble. In the case of mountain biking injuries, that will most likely translate into an attempt to stop the bleeding. For external bleeding, direct pressure, elevation, and use of pressure points should be your first line of attack. However, for injuries that can potentially cause shock, these techniques may not be enough. If you must consider using a tourniquet, remember that it is a last resort; once applied, it should not be removed until the patient has reached definitive care, and the person is very likely to lose the affected body part to amputation. Remember that when you apply a tourniquet, you are making a decision of life over limb; it is as simple--and as dramatic--as that. Apply any tourniquet distal to the involved joint, if possible, to preserve use of the joint. Note the date and time the tourniquet is applied and make this clear for the patient's subsequent caregivers, as by a message across the patient's forehead stating, for example, "TK 4/18 11:45 AM."

Don't forget that, whatever the injury, you must strive to maintain an open airway in your patient. This may mean checking an unconscious or disoriented patient frequently to assure that the patient has not vomited, and, if he has, to clear the airway and prevent aspiration of vomited material. Keeping the patient warm and dry is crucial, since externally assisted maintenance of body temperature will help the brain maintain adequate blood pressure. During transport, keep the patient as flat as possible with the legs elevated. If you are transporting the patient on an incline and must tilt her, keep her head downhill from her feet in order to maintain blood flow to the brain.

CENTRAL NERVOUS SYSTEM INJURY

A crash on the trail may also lead to injury of the CNS--specifically, to head or spinal cord injury. Suspicion of injury to the spine should be raised when an injury is sustained at high speed, or when the damage occurs as a result of a fall from a height--neither of which is an uncommon mechanism of injury in mountain biking. If your patient is conscious and coherent, get him to tell you his story, to explain his own perception of what happened. Write it down, making notes of any suspicious mechanism-of-injury factors. Consider whether any distracting injury, such as a broken bone or dislocation, may be detracting from his ability to evaluate other pain or to recall the events that led up to his crash. Your patient must be reliable in order for his account of events to help you rule out spinal injury.

Signs and symptoms of spinal injury are numerous, and patients may present with different combinations of problems. Guarding is a common result of spinal injury, as is pain. Pain may begin immediately as the patient moves to get up from her fall, or it may occur later as you palpate the spine in an attempt to assess the extent of injury. It may be diffuse, constant, or radiating. The patient may feel numbness, parasthesia ("; ; and needles"), or a "locked" sensation.

Paralysis, full or partial, is an obvious sign of serious damage, and such a patient must be carefully transported out of the backcountry.

The spinal cord, as a transmitting pathway for the CNS, links the communication systems of the body and relays information between the brain and the rest of the body. Damage to the head, however, can interfere with this pathway just as effectively as damage to the cord itself. Head injury is another potentially life-threatening consequence of a mountain biking crash. Whether you're biking in traffic or among trees, always wear a properly-fitting helmet to protect you. Head injury is tough to deal with in the backcountry. The primary danger in head injury is an increase in intracranial pressure caused by swelling as a byproduct of trauma to the brain. The first sign of disturbance in intracranial pressure is a change in the patient's level of consciousness. This may mean that your patient's responsiveness actually decreases or disappears, or it may mean a change in mannerisms and affect, such as increasing irritability or combativeness.

Patients with brain injury tend to exhibit an altered respiratory rate (including the classic Kussmaul's or Cheyne-Stokes breathing patterns) as well as bradycardia and widening pulse pressure. Headache, vomiting, and increased susceptibility to hyperthermia or hypothermia are other common indications of trouble. Finally, unequal pupils, though generally recognized as a classic indicator of head injury, are a late sign, and the absence of this sign should not encourage you to rule out such an injury. Signs and symptoms of a skull fracture, aside from an obvious depression of the skull or penetrating wound, include raccoon eyes, Battle's sign, and cerebrospinal fluid leaking from the nose or ears.

Treatment of a head injury will focus on transporting, monitoring, and ensuring the comfort of the patient. It's generally safest to assume that a head-injured patient has a spinal injury, too. Remember that, regardless of the suspected injury, you should always organize your treatment plan based on the vital signs that the patient is exhibiting. For example, a severe, bleeding injury causing shock may be concurrent with a head injury. If the patient's pulse is quick and his blood pressure is dropping--even if a head injury is apparent as well--your primary concern should be treating the shock.

EXTREMITY INJURIES

Not all mountain biking injuries fall into the categories of necessitating a Band-Aid or a body bag. Some afflictions come as a result of being stronger of will than of body, especially early in the season.

Overuse injuries in mountain bikers are particularly common in the upper extremities. Much of the potential for injury rests in the nature of the sport. Wrists, for example, are bound to become sore when the trail is rough and incessant pounding plagues your ride. Many overuse problems, however, can be avoided by being sure that your equipment is sized properly before you head out on the trail. Good front suspension and padded gloves will also help protect bikers from such injuries, as such equipment will reduce jarring on the wrists and arms, a very real concern if you want to prevent upper-body pain and discourage the development of degenerative arthritis.

Unwise training schedules that push you too quickly can also cause trouble. As in other distance sports, such as running, increasing mileage suddenly or training hard without proper preseason conditioning can cause trauma. The excitement of getting out on the trails after a long, snowy winter can easily tempt you to ride beyond your abilities. Riding in too high a gear and relying too heavily on your large chain ring can also cause injury. Build intensity gradually early in the season, and add hill rides sparingly until you're back to your peak performance level.

Like overuse injuries, the majority of fractures sustained by mountain bikers affect the upper body. An attempt to break a forward fall can lead to a dislocated shoulder or a clavicle fracture. (See next issue's "A Sport for the Season" column on boating for more information concerning dislocations.) A collision with a tree may cause a broken wrist or finger. In all cases of suspected fracture, stabilize the injury, provide non-steroidal anti-inflammatory drugs (NSAIDs) if appropriate (and if not contraindicated by allergy), and transport the patient for definitive care. In the case of a broken wrist or finger, you may be fortunate in that the patient may be able to assist in the rescue. Proceed with caution if allowing the injured person to bike out under her own power. If any sections of the trail become steep or rough, your group should walk until a relatively flat and obstacle-free path can be reestablished.

GENERAL SAFETY

Many of mountain biking's safety concerns are the same as those of any outdoor activity. In all sports, keeping well hydrated should be a key priority, since neglecting fluid intake can make it hard to maintain stable body temperature and good judgment. You'll also need to consider exposure and to guard against sunburn, frostbite, hypothermia, or hyperthermia, depending on the weather in which you're riding. As always, dress in layers of synthetic fabrics whenever possible. Specific to biking, of course, is the need to know basic bike repair and safety. Keep your bike well maintained to discourage sudden equipment failures that can cause injury. Carry spares of essential parts, such as inner tubes, along with the tools and the knowledge that will allow you to make quick repairs on the trail.

Most important to general safety, as is so often the case in the backcountry, is having a keen sense of your surroundings and your place within them. Mountain bikers are commonly accused of being careless around other trail users. This criticism is too often justified. Do your part to avoid perpetuating this stereotype by knowing your environment and by being considerate of other users. Before you head out, determine what type of trail you'll be riding on so you'll know what range of encounters to expect. Will there be hikers, joggers, people walking dogs? Should you expect to see riders on motorized vehicles or on horseback? Keep in mind that horses, in particular, can spook easily, and you need to pass them carefully and with warning. If possible, avoid trails heavily traveled by hikers or horseback riders. Maintain control of your bike on downhills, especially around blind corners, and ride at a safe speed. Proceed with extra caution when you can't see clearly where you're headed.

Respect the trail, too, and avoid riding right after a heavy rainfall or in the early spring, when the ground may be excessively muddy. Loss of traction on wet ground will increase your chances of having an accident, and your bike's knobby tires can wreak havoc on the trail. The latter consideration is especially important in multi-use areas, since mountain biking is a higher-impact sport than most other trail activities, and hikers and joggers may resent not only your presence on the trail but also the scars your bike leaves behind. A little mud can be a lot of fun--and you're certainly not expected to stay clean on a good ride. Just try to keep your activity in a range that won't inflict unnecessary environmental damage and that won't diminish anyone else's enjoyment of the trail.

For your two-wheeled trips through local woodlands and on remote backroads, a little preparation can make all the difference. You'll enjoy your time so much more if you feel confident in your abilities to treat your own bumps and bruises, as well as to care for a fellow rider who might have sustained a more serious injury, if the need arises. More importantly, though, you'll be well prepared if you ride with control, keep up with preventative maintenance on your bike equipment, and leave any excess "attitude" at home when hitting the trail. Don't lose sight of the thrill of that downhill wind--a little risk, after all, is part of the fun. Just be aware of your limits, and consider the impact of your actions on the others in the backcountry. Then get out there and get muddy.

CLEARING THE SPINE... A BRIEF REFRESHER

By Buck Tilton

First, a disclaimer. There is always a slim chance you'll miss a spine injury and cause harm to the patient. If you always want to be certain, every patient with an MOI for spinal injury should be immobilized on a backboard or litter. Wilderness medical training offers a way to clear the spine, i.e., decide to not take spinal precautions, that is extremely accurate, approved by the Wilderness Medical Society (WMS), and adopted by the State of Maine for urban EMTs. It gives all those patients who don't have a spine injury freedom from hours or even days of spinal immobilization, and all those rescuers freedom from carrying a patient miles and miles to have him or her cleared five minutes after arrival at the hospital.

The patient should receive a full patient assessment with his or her spine manually immobilized prior to considering the patient as one who can have his or her spine cleared. Do not allow your wish to clear the spine interrupt the patient's need for a full assessment.

A decision to clear the spine should be made as a separate and distinct assessment, not as a part of the standard patient assessment.

The patient must be reliable: Alert, oriented, without drugs or alcohol on board. Does alert mean alert and oriented to person, place, time, and event, i.e., A+Ox4? That would be best, but if the patient is only A+Ox3 (with immediate loss of vivid memory as to the event), that person could still be considered a candidate for clearing if the rest of the criteria are met. A reliable patient is also free of distracting injuries that could block perception of spinal pain, injuries such as fractured femurs and dislocated shoulders. *An unreliable patient with an MOI for spine injury must be treated for spine injury.*

The patient must have no complaints of pain in the neck and back. Almost all patients with a spine injury will complain of pain, and those free of pain will almost always have some tenderness or guarding in the neck and/or back when palpated. *A patient with an MOI for spine injury who has pain or tenderness in the neck and/or back must be treated for spine injury.*

The patient must be free of altered sensations in the extremities, altered sensations such as numbness on palpation, weakness when checked for strength, pins and needles, inability to move, even temperature irregularities such as cold feet without another reason for cold feet. *A patient with an MOI for spine injury who has altered sensations in the extremities must be treated for spine injury.*

The patient should have palpable pulses in all four extremities. *A patient with an MOI for spine injury who has no palpable pulses in the arms and/or legs must be treated for spine injury.*

So far the patient has passed the test. Now, while supporting the head, ask the patient to gently flex the neck. If no pain occurs, then ask for rotation. If any pain on movement shows up, full spinal treatment follows. If the neck "locks" at one point, either to one side or the other, failing to move through a normal range of motion, full spinal treatment follows.

Now the patient may be allowed to move about freely but cautiously, if no other injuries, of course, would hamper moving about. If the patient experiences the onset of numbness or weakness later, or the onset of sharp pain later--not the tightness of muscle spasms--he or she gets the treatment later (at the time of onset).

Note: In the past, wilderness medical training has suggested rescuers "wait two hours" after an MOI to clear a spine. This was based on clinical data which stated, and still states, that cord impingement will show up within two hours of the injury, a result of swelling. Some time should be allowed in order to let any adrenaline surge that might mask early pain to pass. There is, however, no need to wait beyond the time it takes to do a standard patient assessment: five to 10 minutes. If the spine is damaged, it will cause pain soon. Swelling, should it occur, will probably make the pain worse, but

Process for Clearing the Spine

1. Is the mechanism of injury severe? *Yes: treat. No: continue the process.*
2. Have you completed a full patient assessment and found distracting injuries that could cloud a patient's reliability? *Yes: treat. No: continue the process.*
3. Is the patient unreliable due to decreased LOC, e.g., alcohol, drugs? *Yes: treat. No: continue the process.*
4. Does the patient complain of neck and/or back pain or tenderness, numbness, tingling? *Yes: treat. No: continue the process.*
5. Does the patient have altered sensations in the extremities? *Yes: treat. No: continue the process.*
6. Has the patient lost palpable pulses in the extremities? *Yes: treat. No: continue the process.*
7. Does the neck "lock" at some point, failing to go through a normal range of motion? Yes: treat. No: continue the process.
8. With the head supported, does the patient complain of pain when you gently move the head and neck? *Yes: treat. No: continue the process.*
9. Does the patient complain of sharp neck and/or back pain after being allowed to move about? *Yes: treat. No: clear the spine.*

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patients will experience some pain soon after the injury. To wait too long to clear the spine, even less than one hour, is to risk being fooled by the developing pain of muscular stiffness, a result of muscle strain and not an indication of spinal damage.

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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

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When a Crisis in the Wilderness Becomes a Critical Incident

By D. Craig Newton, MSW, LCSW, BCD, CISM Instructor
and Pat Thorney EMT-I, WFR, and Logger Rescuer

A crisis can happen anywhere, at any time. And it can happen to the most experienced professional. Bill Wilson is a seasoned veteran of wilderness instruction. For ten years, he has led 21-day three-season and five-day winter expeditions with youth at risk. In this article, Bill talks about a trauma he experienced, and we examine the management of the resultant critical incident stress.

"It was a cold day," he recalls. "I had been out for four days with a group of inner-city youth. We were on a typical winter course, a follow-up to a 21-day course I'd done with these kids the summer before. We had gone through all of the precautions that one usually takes during the course to keep people warm and safe: Sorels, foot and hand checks. Everything was by the book. Except for the ambient temperature, maybe. I mean it was bitterly cold that day. We started out for the long hike after breaking camp around 10:30 a.m. Like I said, I thought I'd taken the right precautions. But by the end of the day, one of the 14-year-old girls began complaining of pain in her feet. "I'll never forget it," he concludes. His voice suddenly becomes very quiet. "When I put her foot in my hands and tried to hold it, her toes crunched like frozen meat."

Although Bill was cleared of negligence upon review of the incident by a national peer practices team of outdoor leaders, he felt totally responsible. Even now, knowing that the girl healed fully, Bill can get emotional about what happened. He imagines the face of his young patient. He has "conversations" with her family. He is unable to get the girl and the incident out of his mind. Questions like "What if?" and "How could this have happened?" continue to haunt him. At the outset, Bill was plagued with a feeling of sadness that lasted for weeks.

It is important to understand the emotional consequences that result from a situation like this. After doing everything in his power to protect the teenagers from the cold, Bill is shocked to find out that an injury has occurred. His assumption of providing safety has been shattered. Harm has come to a girl under his care. As a first responder, Bill knows what to do with a frostbite injury. He can provide first aid and proceed with the evacuation of the patient. He can manage the wilderness crisis. But as a caregiver, he has emotional consequences to cope with as well. Bill is plagued by unresolved feelings. He can't seem to forget the sight of the girl's frostbitten skin, the sound of her toes crunching, the way her frozen foot felt in his hands. Thoughts of responsibility trouble him. He knows that he did the best he could and that he followed protocol. But thoughts of "What if?" go on for days. He continues to work but there is no closure to this incident.

When a person presumes everything to be okay and it turns out not to be, the thought process that follows can be overwhelming. Self-doubt, second-guessing, and an inability to concentrate commonly result. When someone bears witness to an injury of this magnitude and feels connected in some way to the injured person, there often is an imprinting of sights, sounds, and tactile sensations for some time after the incident. Future situations may remind the witness of the upsetting incident. The witness may choose to avoid the incident location and similar circumstances. Depending on the seriousness of the situation or the resulting actions of those involved, such an event may be defined as a critical incident. Search and rescue efforts are defined as critical incidents when they result in high levels of emotional reaction by the responders. These reactions can

be the result of circumstances surrounding the situation or of duration or intensity of the rescue effort. Extreme frustration can also result in an emotional response that needs to be addressed as a critical incident.

Critical incident stress (CIS) is an emotional reaction to a situation that has the potential to overwhelm a person's coping mechanism and to impact his or her ability to function at full capacity. Wilderness group leaders and search and rescue personnel can define potential critical incidents for themselves and can then work with critical incident stress management (CISM) instructors to develop appropriate responses and services. To date, most training programs have not prepared wilderness trip leaders or search and rescue personnel for the potential emotional consequences of critical incidents, but with a strong CISM program, the impact of CIS can be minimized.

One very experienced rescuer, who has participated in over 250 rescues, recounts details of a trip he led to recover the body of an eight-year-old child killed in the backcountry: "I was anxious when I returned home. We had to carry the victim, a young boy, several miles out of the woods without a body bag. The boy was the same age as my son. Once home, I started to get worried, thinking that a similar situation could happen to my child." The rescuer expressed how this incident reminded him of how vulnerable we can be to "bad situations" and how he would feel devastated if it were his child.

Emotions can run high during a crisis, and the physical demands on rescuers can be extreme. Every search and rescue effort is a response to a crisis. People who work in search and rescue must remember that they are are susceptible to the emotional consequences of their work. Even experienced responders can suffer emotional consequences following the recovery of a child.

During any crisis, there are "normal" reactions that need to be understood. (See "Reactions to Critical Incident Stress" insert.) After a critical incident, participants may feel like withdrawing from family or friends and coworkers. Participants frequently experience sadness, anger, and a range of other emotions. There may be a period of time during which concentration is impaired, sleep is difficult, and the person feels agitated. Following a critical incident, it is to be expected that second-guessing of one's actions will occur for at least a few days. It helps to understand these reactions as predictable and not a sign of "going crazy." Proactive education before incidents occur leads to better understanding in this reactive environment.

Specific training and education are needed to develop a CISM system that ensures an appropriate level of response to critical incidents. First, teams need to consider a training session in which potential critical incidents and the subsequent predictable reactions are defined. The goal here is to educate people by giving them the tools that will allow them to be more resilient after a crisis.

Training should also focus on the specific interventions available after a critical incident. (See "Seven Interventions for Critical Incidents" insert.) These interventions are part of a CISM program. Possible interventions include one-to-one peer support or a group defusing soon after the incident. For incidents

REACTIONS TO CRITICAL INCIDENT STRESS

PHYSICAL:

- Nausea
- Upset stomach
- Chills
- Diarrhea
- Rapid heart rate
- Muscle aches
- Sleep disturbances
- Dry mouth
- Vision problems
- Fatigue tremors (lips and hands)
- Feeling uncoordinated

EMOTIONAL:

- Fear
- Sadness
- Grief
- Anger
- Worry
- Hopelessness
- Feeling overwhelmed
- Feeling lost
- Feeling numb
- Feeling abandoned
- Wishing to hide

BEHAVIORAL:

- Change in activity
- Withdrawal
- Suspiciousness
- Change in communications
- Change in interactions with others
- Increased/decreased food intake
- Increased smoking
- Increased alcohol intake
- Excessive humor
- Excessive silence
- Atypical behavior

COGNITIVE:

- Confusion
- Lowered attention span
- Calculation difficulties
- Poor concentration
- Distressing dreams
- Survivor guilt
- Disruption of logical thinking
- Blaming someone
- Identifying with the victim
- Seeing an event over and over

SEVEN INTERVENTIONS FOR CRITICAL INCIDENTS

Pre-incident education
Individual/peer support
Defusing
Debriefing
Demobilization
Family support
Follow-up

that have significant emotional impact on a group, a debriefing should be led by experienced CISM personnel, including mental health professionals, any time from 24 to 72 hours after the incident. Other interventions include family support and long-term follow-up.

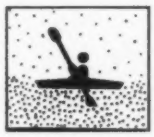
The final crucial component of this plan requires the development of a CISM support team. This team should consist of CISM-trained peers who are able to respond to wilderness groups and search and rescue parties after critical incidents. The team should have consulting mental health professionals available for debriefings and supervision as needed. Currently, very few CISM support teams are available to search and rescue teams in most states.

Crisis intervention techniques and CISM training are now standard in most first responder training programs for emergency medical services teams and for police and fire departments. It is now time to include CISM education with all wilderness leaders' and search and rescue teams' training. It is also time to have support available for responders when the emotional consequences of a situation or rescue effort become extreme. The goal is to educate about CIS first, then to provide CISM services when critical incidents occur.

Craig Newton is a clinical social worker at Yale-New Haven Hopsital and a lecturer at Yale University School of Medicine, both in New Haven, Connecticut. He has been involved in critical incident stress management since 1986. Pat Thorney is co-founder of Above & Beyond, a full-service training firm in personal and professional development. She is also a Wilderness Education Association certified expedition leader and a teacher of high-angle rescue classes. To find out how to enroll in a basic CISM course, please contact the authors at (203) 481-9576 or (860) 435-4681.

A SPORT FOR THE SEASON

Rebecca S. Newton, WEMT



Featured in this issue:
Kayaking

Perhaps you dream of drifting along the Maine coast in your graceful sea kayak, silently watching the late-autumn sky burn into shades of orange as the sun goes down. Or maybe your fantasies run faster, filled with adrenaline, focused on Colorado whitewater and dodging rocks as wave after wave cools your hot summer skin. Whatever your pleasure, kayaking is a wonderful sport for all seasons. Though kayakers tend to avoid many of the stress injuries that plague the leg bones and joints of land-bound athletes, kayaking has its own set of risks and frequent injuries. Acute injuries to the joints of the upper body are common, as are overuse injuries to the arm and lower back. Threats of the environment must be guarded against, as in any outdoor activity. Water itself creates a unique environment, and care must be taken to protect paddlers from drowning and near-drowning, two of the greatest life-threats in any water sport.

ACUTE INJURIES

Dislocations

Shoulder dislocation is one of the most common serious injuries suffered by kayakers. The whitewater runner's high brace is a common cause of shoulder dislocations, as is a paddle raised against strong ocean surf. Even the most informed boater, knowing that she shouldn't lift her arm above a ninety-degree angle to her torso, can be knocked into a high brace by a sudden wave of swift water. A lift of the paddle combined with a twist of the arm can knock the humerus out of its socket, forcing it forward and downward, into the anterior/inferior dislocation position. In this kind of injury, accounting for over ninety percent of shoulder dislocations, the patient cannot bring the extremity to rest across the chest. Often, the patient will be found supporting the obvious deformity in the most comfortable position, which will necessarily be angled away from the body in some fashion. This feature will help differentiate it from a fracture of the humerus, in which the patient will generally be found supporting the arm in a sling position across the chest. In addition to the typical

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postures of the shoulder dislocation, extreme pain and a pronounced loss in range of motion will help you to identify this injury.

In an urban environment, a person with a dislocated extremity would be splinted as found and brought quickly to a hospital for reduction of the injury. In the wilderness, the luxury of the hospital does not exist. Reduction must be attempted on the scene, as a prolonged dislocation can compromise circulatory and neurological function and cause permanent disability. Dislocations are most easily reduced soon after they occur, before swelling and muscle spasm set in. You should work quickly but calmly to assess the injury and to attempt reduction.

Before beginning an attempt at reduction, assess baseline circulation, sensation, and motion in the extremity distal to the injury site. Gather a quick history from the patient, both about the events that led to the current dislocation and about any past pertinent injuries. Reduction of a dislocation should always include communication with the patient, both to gain his trust and to enlist his help in the process. Many people who dislocate a shoulder have done so in the past; this is a common recurrent injury. If your patient has been through this before, he will likely know what works best to reduce the injury. Ask his advice, and follow it. Whether the patient offers advice from experience or just from what feels best, be sure to talk him through the process and to get feedback continually.

There are several ways to reduce a shoulder dislocation. One of the most commonly successful and least painful methods requires the patient to lie on his back. If possible, provide countertraction by securing the patient's torso to a point opposite the injury, using a wide band of fabric tied to a stationary object or held by a second caregiver. Start by pulling from the bend of the elbow, applying gentle but firm traction along the line of the current orientation of the upper arm. As you maintain traction, you may try moving the arm carefully and gradually toward the normal position. Do not use jerking motions and stop immediately if the pain increases significantly. Another favored method of shoulder reduction encourages the patient to stand, keeping his legs straight while bending forward from the waist. He then rests his head on his uninjured arm, which is bent at the elbow and comes across the forehead for support. His injured arm will hang straight down, perpendicular to the ground, and gentle traction can be applied to it by grasping just above the elbow and supplementing gravity's pull. This second method is probably the best way to attempt reduction if you find yourself alone with a dislocated shoulder. Remember, while the reduction should be attempted as soon as possible after an injury, reduction is not usually quick. Take your time while maintaining gentle, steady pressure and expect the process to take at least several minutes. Regardless of the method used for reduction, the shoulder should always be supported with a sling and swathe after reduction has been completed.

Finger and thumb dislocations are another common result of a paddle suddenly encountering resistance. The best means for simple relocation of a finger is generally a quick but controlled push back into place, exerted from above, along with traction in line. The thumb can be resistant to relocation, especially at the joint where it meets the hand. Attempt relocation once. If your effort fails, splint the injury in the position found. With this kind of dislocation, an associated fracture of the wrist is common and may be assumed. The injury should be splinted as a wrist fracture, taking care to immobilize both the thumb and the wrist. If the thumb has been successfully reduced, it may be splinted directly against the hand. If the patient must continue to paddle, a well-padded splint, such as a cut foam pad contraption forming a sort of cup in the palm of the hand, may help to minimize pain.

Long-term care tactics of reduced dislocations should focus on two basic goals: prevention of further injury and promotion of healing. Most patients will appreciate having the injured part splinted in a position of comfort. Coupled with immobilization, a combination of rest, ice, and non-steroidal anti-inflammatory drugs (NSAIDs) will help to minimize pain. The patient should be encouraged to move the injured joint through a careful series of normal range-of-motion activities. As a caregiver, you should continue to assess the state of the injury after reduction has been carried out successfully. Specifically, take care to monitor circulation by checking the pulse beyond the affected joint frequently and by assessing skin color and sensation. Again, the patient can participate in her own care. Ask her to notify you if she notices a change in her condition or an impending problem. Remember that the advantages of an early return to normal position include not only a lessening of pain and damage to the patient, but also a greater ease of transport and a corresponding decrease in risk to group safety. Upon return to the frontcountry, have all dislocations assessed by a physician to check for associated fractures or

compromises in the circulatory and motor systems.

Abdominal Trauma

Taking a swim in waves or in whitewater can cause any number of traumatic injuries. Collision with a large rock or with a boat or paddle gone astray may cause blunt trauma to the abdomen. Closed injuries incurred by abdominal trauma can be very serious, particularly in the backcountry where the injured person is far from definitive care and cannot be offered surgical intervention.

The abdomen is the region of the body best at concealing major blood loss. For a period after the incident, the patient may seem in no great distress and the injury may appear minor. This is a result of the body's compensation immediately following internal injury. If the mechanism of injury suggests major abdominal trauma, however, corresponding damage should be assumed even if the patient initially presents as fairly stable.

When ruptured, hollow organs such as the stomach, intestines, and bladder may release such harsh substances as acid or bacteria into the abdominal cavity. Solid organs, including the liver, pancreas, kidneys, and spleen, will bleed when ruptured, leading to shock and its related complications. Any of these foreign substances will cause intense pain, tenderness on palpation—possibly indicated by guarding—and a life-threat to the patient. Swelling, rigidity, and discoloration will increase as blood and other misplaced fluids continue to invade the abdominal cavity. Expect vomiting, and take care to maintain the airway. Blood in the vomitus, with the characteristic "coffee grounds" appearance, is a sure sign of damage, as is blood in the urine tinting it pink or in the stool coloring it dark and tarry. Decreasing bowel sounds over time should be cause for concern, as this sign may indicate ensuing paralysis of the intestine.

Since the patient is increasingly likely to vomit as shock diverts blood from the digestive system, avoid giving anything by mouth, unless small sips of water are required to prevent dehydration during a long evacuation. Keep her warm and dry, allowing a position of comfort—which will generally involve flexion of the knees—if no other injuries contraindicate the chosen position. A good prognosis for the patient depends largely on the caregiver's ability to recognize the seriousness of the injury and to coordinate rapid transport to definitive care. The best care that you can give this patient will involve evacuating her from the backcountry as quickly and as comfortably as possible.

CHRONIC INJURIES

Overuse Injuries

Repetitive motion injuries of the tendons, a threat to all those who depend on their arms for coordination and for strength in action, are the frequent bane of kayakers. Among the afflictions are tendinitis, tenosynovitis, and carpal tunnel syndrome. Tendinitis is a general term for the inflammation of tendons that comes along with repetitive movements and stems from a weakening of the tendons as a result of overuse. Similarly, tenosynovitis is brought on by the swelling of the tendons that results from repeated forceful strain on the hands. Carpal tunnel syndrome is caused by the inflammation of a specific group of tendons, those that pass from the wrist into the hand. When these tendons swell as a result of overuse, they generate pressure on the median nerve, causing pain and numbness to spread through the arm. Kayaker's elbow, a sport-specific variation on the classic tennis elbow, is the upper limbs' version of water on the knee and can also be a painful and debilitating injury.

You can avoid repetitive strain injuries and related tendon irritation by minimizing the motions that most often cause such damage. The most effective way to do this is to master solid basic skills and to make a conscious effort to use good technique. In terms of equipment, you can also minimize repetitive strain by choosing your paddle well. Some experienced distance paddlers recommend an unfeathered paddle, while others tout the forty-five degree offset as the ideal compromise. All recommend that you avoid grasping your paddle too tightly and build your strength gradually, working up to longer distances and wilder waters only once you've mastered easier passages.

If you feel numbness or pain in your arms as a result of too much paddling, the best relief will come from rest, NSAIDs, and the support of firm elastic bandages. Kayaker's elbow, in particular, should mandate a week's rest, as the seriousness of the injury is compounded by decreased healing of wounds or infections in the arm during the affliction. Damage from carpal tunnel syndrome, more so than from generalized tendinitis, tends to be long-lasting and may require surgical intervention.

Lower-back pain

Strain on the lower back as a result of incorrect lifting of boats and gear or of prolonged sitting while on the water can be remarkably incapacitating. Even with rest, days to weeks may pass before the pain completely vanishes. However, you may

be able to make yourself functional, if not fully healed, within a few days using a combination of rest, focused exercise, and ice. Begin resting first on your side or on your back with stiff padding behind your knees. With too much rest, your muscles will begin to weaken, so you should try to incorporate some light exercise, such as easy walking, into your routine as soon as pain will allow. As you begin to feel stronger, include gentle abdominal crunches. Stop if you feel any increase in pain. Massage and icing will also decrease healing time, and NSAIDs can help bring down swelling. The best treatment for lower-back pain, though, is clearly preventative. Back pain can be difficult to quell once you sustain an injury and may recur over the course of months or years if not treated adequately at its outset. Prevent strain to your back by stopping every hour or so, when possible, to stretch or by frequently stretching your legs inside the boat when you can't get to shore.

ENVIRONMENTAL PROBLEMS

Sunburn

Long days on the water can lead to heat-related injury, as in any outdoor sport. Paddlers are particularly susceptible to sunburn, whether from direct exposure or from sunlight bounced off the reflected surface of the water or refracted through clouds. Sunscreen, protective clothing and headwear, and common sense can all help decrease sun damage to skin and avoid the pain that goes along with a bad sunburn.

If a sunburn is suffered in spite of your best attempts to avoid too much exposure, do what you can to soothe the skin. Cooling with clean water can provide relief, as can topical analgesic creams or sprays. Keep in mind that sunburn increases the risk of dehydration, as well as susceptibility to both hypothermia and hyperthermia, and encourage the sufferer to drink extra liquids. If blisters form, do not pop them, as this will facilitate infection. Avoid further sun exposure to already-damaged skin.

Dehydration

Dehydration is another prominent concern for anyone in the wilderness, increasing susceptibility to hypothermia, hyperthermia, and a whole host of other environmental concerns and accidents. (See "A Sport for the Season" Nov/Dec 1998 column for discussion of hypothermia and "A Summer Review of Heat Illnesses" in the Jul/Aug 1998 issue for coverage of hyperthermia.) Boaters are not immune to dehydration, in spite of spending their days surrounded by water. Be sure to plan a means of water disinfection or desalination for your trips, as most natural sources, untreated, do not provide reliably safe drinking water. The hassle of needing to urinate frequently can discourage adequate hydration during boat trips. If you neglect to take in adequate fluids while paddling, be sure to drink plenty of extra water or decaffeinated hot drinks each evening to catch up. It's generally easier to crawl out of your sleeping bag at night than to get to shore during the day. A constant dampness and the cooling effects of splashing waves can lull you into complacency. But being moist is not equivalent to being hydrated. Be sure to drink a minimum of several liters each day, even in cool, damp conditions.

Dampness & Hygiene Issues

While keeping diligent watch for dehydration, boaters should not neglect to guard against troubles brought on by continual dampness. A wide range of problems, from superficial skin irritations to the serious threat of trenchfoot, can be precipitated or exacerbated by excessive moisture.

Chafing and rashes are common side effects of spending long hours in a small boat, as sand and sea debris can cause irritation when trapped in wetsuits or drysuits. Pressure sores may arise after long hours of sitting in one position. Treat the condition found. Clean and bandage any wounds, taking care to keep bandages dry. You may choose to soothe skin with topical anti-itch ointment or other relief creams or gels. Longer-term care should include preventing and monitoring for signs of infection. To prevent these irritations, keep skin dry and clean, consider using powders if they tend to work well for you, and get out of your boat to stretch and to change position when possible.

Dampness can also cause hygiene troubles, particularly vaginal infections or urinary tract infections in women. (See "Gender-Specific Emergencies" in the Nov/Dec 1998 issue.) Again, keeping clean and dry will go a long way toward preventing problems. Treat the cause of the trouble, and provide an environment in which it can heal.

Most serious of all the injuries caused by dampness may be trenchfoot, a non-freezing cold injury that can lead to gangrene or nerve damage. (See "A Few Words of Wisdom on Trenchfoot/Immersion Foot" in the Sep/Oct 1998 issue.) Prevent trenchfoot by keeping feet dry, by changing socks regularly, and by never sleeping in wet socks at night.

IMMERSION & SUBMERSION INJURIES

The difference between immersion and submersion is a matter of a few millimeters, at most—and so, accordingly, is the difference between breathing air and taking water into the lungs. The most common immersion-related concerns have to do with the effects of cold on the body. Hypothermia can come on quickly, even within a few minutes of falling into frigid waters. When hypothermia is acute, handle the person very gently, and be sure he is dry and well insulated before exposing him to external warming sources, as a sudden change in temperature may send a shock to the system drastic enough to cause cardiac failure in extreme situations.

While the immersion victim can be in great distress and in grave danger, it is the submersion victim who will most likely be at extremes—either panicked or unconscious. To assist a struggling swimmer, follow these rules of rescue: reach, throw, row, tow, go. If you can reach the person from a stable point on shore, offer a hand or an outstretched branch, or throw a buoyant object to give support and flotation. If you're throwing something, be sure to aim upstream from the person so he will be able to reach the object as it moves toward him rather than be forced to watch helplessly as it floats away from his grasp. You may row if you have a raft, a boat, or another means of venturing out to help. Alternately, you may choose to throw a flotation device on a tow rope and to pull the swimmer into safety. Swimming out to the person is always a last resort. Remember that to get into the water with a struggling swimmer is to risk your own life. Drowning people have incredible strength, inspired by panic, and will pull you down with them. Only consider swimming out if you are an experienced water rescuer and are fully willing to risk your life to help.

Once safely on shore, assess your patient. If he is unconscious, check respirations and pulse and perform rescue breathing or CPR as necessary. Expect him to vomit as water is forced out of the lungs, and be sure to keep the airway clear and to avoid allowing aspiration of vomitus. In any submersion victim for whom the mechanism of injury involves flipping a boat in whitewater or for whom the mechanism of injury is unknown, assume a spinal injury and treat with caution, including use of a modified jaw thrust during artificial respiration, until such an injury can be ruled out by a thorough history taking and patient assessment. All immersion and submersion patients should be treated for hypothermia once primary life-threats have been addressed.

Problems caused by submersion will generally be more complicated than those caused by immersion. Even near-drowning patients who are part of a successful rescue may not survive the injuries incurred in the submersion. Having taken water into the lungs, some submersion victims will die hours, days, or even months after the rescue from related problems, including complications of pneumonia or other lung ailments. Even after a successful rescue, always bring a near-drowning patient to definitive care for evaluation and follow-up treatment as soon as you're out of the backcountry.

As in so many backcountry maladies, prevention is key when it comes to paddling injuries. In the case of chronic and environmental problems, in particular, maintaining awareness of your comfort level and of threats in your environment can keep you alert to impending problems before they escalate to the point at which they can ruin a trip. Water-based environments are full of inherent dangers. Your best defense is to anticipate problems and to keep your skills sharp. For sea kayaking, practice rolling, towing, and re-entry positions. For whitewater boating, focus on swift-water rescue techniques and develop a strong low and high brace. Learn to be a confident swimmer, but never let a healthy confidence in your own strength overshadow respect for the power of the water. If you keep your skills current and your equipment in good shape, you'll never let a lack of preparedness keep you from enjoying that shimmering sunset or that classic big wave.

This article concludes the column "A Sport for the Season." Look to the past three issues of the WMN for installments on backcountry skiing (Nov/Dec 1998), trail running (Jan/Feb 1999), and mountain biking (Mar/Apr 1999). Thanks for reading!

The *Wilderness Medicine Newsletter* is intended as an informational resource only. Neither the *WMN* nor its staff can be held liable for the practical application of any of the ideas found herein. The staff encourages all readers to acquire as much certified training as possible and to consult their physicians for medical advice on personal health matters.

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CHILDREN GOING TO THE MOUNTAINS

By a working group of the Medical Commission of the
Union Internationale Des Associations D'Alpinisme

Healthy children can go to the mountains safely depending on their ages and the parental knowledge of mountain environments and risks. Walking, climbing, or skiing in the mountains must be a pleasure for the child. It is important to adapt the length of the activities to the age and fitness of the child and to respect rest times. In general, since each child develops individually, the advice given below should be adapted individually. As long as the parents do not take the children along with them in the mountains, but, rather, the other way around—the parents (teachers or youth leaders) accompany the children—adventure and fun are not far away.

Specific Altitude Risks

Children are not under more restrictions to acute exposure to altitude than adults, at least not below 3000 m at sea level. Above 3000 m, data are lacking, and only caution can be recommended. Children may not be able to express the symptoms of altitude sickness, and the parents should, therefore, be alert to recognize headache, nausea, vomiting, or difficulty in breathing. These symptoms should not be attributed to childhood illnesses. They may be the result of altitude illness and must be evaluated by a medical professional. If medical attention is not immediately available, every effort should be made to descend. Medications preventing Acute Mountain Sickness (AMS) in children are not recommended, and it is imperative to respect acclimatization rules. Infants with any known health risks should not be taken to altitude.

Ear, Nose, and Throat Risks

Risk of otalgia or otitis is greater with rapid changes in altitude and barometric pressure. Do not take sick children on cable cars or chair lifts. In case of rapid pressure changes, let babies suck frequently. If the infant has a cold, it is better to cancel the trip; if impossible (to cancel the trip), clean the infant's nose as much as possible with saline solution to avoid blocked nose.

Cold

The risk of frostbite and hypothermia is higher for children because of less subcutaneous fat for insulation, lower energy reserves, and higher body surface-to-weight ratios which lead to higher heat losses. Clothing and shelter must be adapted and should be regulated during the day by responsible adults. Since children lose a great deal of heat through their head, it is important to keep their heads covered to protect them from the cold. A backpack baby-carrier in cold weather can be dangerous, since the baby may cool down very fast due to impaired blood circulation.

Sun

More than for adults, protection from UV-rays is essential for children. Walk and rest in shady places. Protect the skin with adapted clothes and the naked skin with a highly protective sunscreen. Protect the eyes with sunglasses of good quality. It is recommended that children wear sun hats.

Nutrition

As with adults, children should drink plenty to reduce the higher risk of dehydration, which can lead to: frostbite in winter, heat stroke in summer, and tendon and cartilage lesions. Children must eat regularly to prevent low energy reserves. Do not allow children to skip a meal.

Carrying a Rucksack

Children's backbones and joints are not yet fully developed, and overloading (heavy backpack, long steep descents) in the youth may result in damage for life. Accordingly, heavy backpacks should be avoided. A rule of thumb for the weight of the child's rucksack is not more than 1 kg before age 5, less than 3 kg before age 8, and less than 5 kg before age 12. Let the child carry the water bottle.

Taking a Rest

Children get tired quickly, but recover fast as well, even while playing during a rest. So frequent breaks are important.

(continued next page)

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Acute Mountain Sickness (AMS)

A diagnosis of AMS is based on a recent gain in altitude, at least several hours at the new altitude, and the presence of headache and at least one of the following symptoms: gastrointestinal upset (anorexia, nausea, or vomiting), fatigue or weakness, dizziness or light-headedness, and difficulty sleeping.

PREVENTION

Above 2500 m prevention must be the same as for adults:

- Progressive ascent (300m vertical distance of sleeping altitudes)
- Moderate activity on arrival
- Descent if symptoms of AMS persist

–Children Going to the Mountains continued

About the Authors: The Union Internationale Des Associations D'Alpinisme (UIAA) is an international organization of mountaineers, physicians, and backcountry experts who set world-wide standards in mountaineering and climbing. The Medical Commission of the UIAA works to record, consider, discuss, and publish all health and medical affairs in the entire area of mountaineering and climbing within the framework of the assignments and goals of the UIAA. This article is reprinted by the permission of Franz Berghold, MD, (University of Salzburg, Austria) past president of the UIAA Medical Commission.

MEDICAL CONSIDERATIONS FOR PATIENT TIE-INS

By Keith Conover, MD, FACEP

Take a minute of your time to read this, and to think about the medical aspects of how you tie patients into a litter. I'm not thinking about security: you don't want your patient to fall out of the litter, even on a nontechnical evacuation, so every patient needs to be secure in the litter. I'm not thinking about packaging for hypothermia, or rigging the tie-ins to secure a patient with a broken leg, broken rib, whatever. I'm thinking about the medical effects of your tying the patient into the litter. What effects will this have?

Well, first, the patient can't move. Immobilization has several medical effects. For someone with a broken spine, immobilization may prevent neurological injury to the spinal cord or the nerve roots coming out of it. For other broken bones, immobilization is good, too, at least up to a point. Actually, for certain fractures, too much immobilization can be bad. For instance, assume someone has a small fracture of the head of the radius (just beyond the elbow, on the outside of the arm). How long should it be immobilized? Only for about three days, and only using a sling. After this, you need to get it moving again to prevent permanent stiffness in the joint. It'll be rare that you care for someone with a radial head fracture for more than three days, but the point is that immobilization is not always good.

Immobilization also tends to make bones weaker, but this effect occurs over weeks, and is not likely to be a problem during the average backcountry rescue. Immobilization means that blood doesn't get pumped back to the heart very well. The veins pump blood back to the heart by way of one-way valves. They work when the surrounding muscles alternately contract and relax, squeezing different parts of the vein. If the legs and arms aren't moving, there is no pumping action, and the blood tends to stagnate in the arms and legs. This means there is less blood return to the heart, and the arms and legs may even get puffy (edema) from the extra fluid there. For this reason, immobilization is a significant risk factor for a clot in the leg (a deep venous thrombosis or DVT). A piece may break off the clot and travel to the lung (a pulmonary embolism or PE). When it reaches the lung, it prevents blood from getting through the lung. This usually produces chest pain, shortness of breath, and, if large enough, immediate death. Another important risk factor for DVT and PE is dehydration. Backcountry rescue patients are almost invariably dehydrated, from cold exposure and hypothermia if nothing else. A third risk factor, quite relevant to all types of backcountry rescue, is local trauma to the legs.

So, you see, by tying the patient into the litter, you're taking a patient who is at high risk for DVT and PE and immobilizing him or her, making DVT and PE even more likely. Is there anything you can do? If the patient is conscious, you can prompt the patient to alternately tighten and relax the legs. If you have a long wait because some of the rigging isn't ready, and the patient doesn't have a suspected spine injury, untie the patient and let him or her move around a little. Try to hydrate the patient as best you can: IV fluids if available, Gatorade or something similar if it's okay for the patient to take oral fluids (a whole separate article). There are medications that may help: blood thinners will help prevent clots. However, if your patient is bleeding, or may be bleeding, blood thinners are not a good idea. (For instance, if someone suffered a blow to the head with decreased level of consciousness, then you would worry about bleeding in the brain, and not give blood thinners.) One blood thinner that you probably have in your pack is aspirin. A single small dose of aspirin is all it takes. (The dose is about 40 mg., which is half a "baby" aspirin, or a small fraction of a 325 mg. regular adult aspirin.) Larger doses don't have any more effect and may actually have less of a blood-thinner effect. Heparin is a blood thinner that is more potent than aspirin, but must be given as an injection into muscle or through an IV. However, heparin is not a standard prehospital drug even for paramedics, and should only be given on a doctor's order.

There is one final thing that you can do. Be careful of your leg tie-in. Anything tight around the leg or ankle will decrease venous flow and promote clotting. If you can leave room for the patient to wiggle his or her legs, that's even better.

The next time you package a patient, think about venous flow, DVTs, and PEs.

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BUYER BEWARE: WHAT'S GETTING ON YOUR SKIN?

By Jeff Backer, Jr., DMA, NREMT

Every day you take care of your children, love them, and pray they stay out of harm's way– but you probably don't know that every day you dowse them and yourself with the same harmful corrosive ingredients found in brake fluid, degreaser, and antifreeze. Soaps, shampoos, bubble baths, and cosmetics are loaded with several dangerous chemicals. For instance, in 1993, an FDA survey found the highly toxic 1,4 dioxane, a cancer-causing deadly chemical, in all but three of thirty children's shampoo and bubble bath products that were analyzed.

Cosmetics, skin creams, all bar soaps (clear or white), body lotions, shampoos, and deodorants are the least regulated products under the Federal Food, Drug & Cosmetic Act (FFDCA). Disturbingly, the FFDCA does not require premarket safety testing, review, or approval for these products. Cosmetic manufacturers are not required to register their companies, products, ingredients, or adverse reactions reported by consumers with the Food & Drug Administration (FDA). Except for a handful of banned chemicals, manufacturers can add almost any ingredient to personal care products. "You know more about the ingredients in your dog's flea collar than you know about toxicity of whatever you're putting on your skin," argues David Wallinga, a senior scientist with the Natural Resources Defense Council in Washington, D.C. "Even if the [Food and Drug Administration] suspects that serious adverse health effects are caused by a cosmetic product, they can't require the manufacturer to provide test data to prove the product's safety," says Oregon Senator Ron Wyden.

"Every day we use products that we think are safe– we assume the product has been tested and any dangerous ingredients labeled. The truth is, products are not always safe and manufacturers don't have to tell us so," writes David Steinman, consumer advocate who has investigated the safety of thousands of products over the past fifteen years. "You cannot be completely healthy if your skin is not healthy," says Linda Chae, a world-renowned expert in cosmeceuticals and nutrition for the skin. The skin is the largest organ of the body and considered the "third kidney" because it assists in releasing toxins from the blood. "When we apply products, even with minute amounts of toxins, they enter our internal system and build up in our organs and this is not limited to children only," says Ms. Chae.

The word non-toxic appearing on many consumer products is misleading. "According to the federal definition, non-toxic doesn't necessarily mean "not at all toxic" or "absolutely safe," but can mean that up to half of the laboratory animals exposed to the product through ingestion or inhalation die within two weeks," states Ms. Chae. As for possible long-term effects of exposure, says John Bailey, director of the FDA's office of cosmetics, "Those kind of issues are not addressed very well." According to Mr. Ben Fuchs, a pharmacist and leading cosmetic chemist, "The most notable and long-term side effects would be dermatitis, itching, eczema, psoriasis, scaling conditions, excess growth, plus cancer is not unheard of from long-term use."

Sodium Lauryle Sulfate (SLS) is the most harmful ingredient in personal care products, but is widely used because it is a cheap detergent and foaming agent. SLS is a harsh industrial detergent used in garage floor cleaners, engine degreasers, and carwash soaps. Research has shown that SLS and Sodium Laureth Sulfate (SLES) may cause potentially carcinogenic nitrates and dioxins to form in the bottles of shampoos and cleansers by reacting with the other ingredients found in these products. Large amounts of nitrates can enter the blood stream through the skin from just one use. SLS causes eye irritation, is linked to cataracts, and delays healing of corneal tissue. The Journal of the American College of Toxicology writes that SLS impairs proper structural formation of young eyes and causes permanent damage. Dr. Keith Green, Ph.D., D. Sc. of the Medical College of Georgia reports that SLS denatures proteins of the eye tissues, impairing development permanently. Because it is absorbed through the skin, it does not have to enter the eye directly. This toxin is often disguised in so-called natural products as "derived from coconut," but remains a toxic substance, capable of all the above effects.

Another harmful ingredient found in most personal care products is Propylene Glycol. Commonly abbreviated as PEG, propylene glycol serves as a humectant (it makes the skin feel moist), but is really "industrial antifreeze" and the major ingredient in brake and hydraulic fluid. Material Safety Data Sheets (MSDS) warn to avoid skin contact as it has systemic consequences and exposure can cause brain and liver abnormalities, kidney damage, gastro-intestinal disturbances, nausea, headaches, and vomiting, as well as central nervous system depression. The American Academy of Dermatologists reported, from a published clinical review, that propylene glycol causes a significant number of reactions and was a primary irritant to the skin even in low levels of concentrations.

Industry critics, such as Ms. Linda Chae, suggest reforms like establishing industry-wide standards for safety testing and reviewing data from countries that have banned these particular ingredients. For educational information on the healthy choices you can make for your family, call or write the Institute for Nutritional Health at 316 West Broadway, Browns Valley, Minnesota 56219 (888-564-7025).

DISPATCHES

SOLO Wilderness & Emergency Medicine of Conway, New Hampshire is going West. After eight years of representation in the West by their "sister school," the Wilderness Medicine Institute (which, as of September 1, 1999, is officially owned by the National Outdoor Leadership School), Stonehearth Open Learning Opportunities (SOLO) will re-establish their connections in the western United States and re-commence offering their high quality wilderness and emergency medicine programs. Interested sites in the West (or anywhere in the world, for that matter) should contact SOLO about sponsoring a course at 603-447-6711 or 888-SOLO-MED. Competitive pricing and great discounts are available.

SARSCENE '99—Leading SAR into the Next Millennium, a search and rescue workshop aimed at providing a forum for Canadian search and rescue personnel to voice concerns, share ideas, and build strong communication bonds in the field of search and rescue, is hosting their eighth annual multi-jurisdictional conference in St. John's, Newfoundland from October 13-17, 1999. Participants are expected from air, land, and marine organizations across Canada including the Department of National Defense, Royal Canadian Mounted Police, Environment Canada, Department of Fisheries and Oceans, Canadian Heritage, and many more. For more information call 613-992-8215 or 800-727-9414 or send e-mail to <isabelle@nss.gc.ca>.

Wilderness & Environmental Medicine, the official journal of the Wilderness Medical Society, was recently indexed in *Index Medicus*. *Wilderness & Environmental Medicine* presents a scholarly forum devoted to the publication of original scientific and technical articles related in whole or in part to wilderness medicine, including reviews and abstracts of current literature. This peer-reviewed quarterly journal can be obtained through the Wilderness Medical Society's Lawrence, Kansas publishing office. For details call 785-843-1235 or 800-627-0932. For information specifically on the Wilderness Medical Society, contact their new Colorado Springs office at 719-572-9255.

Yearbook of Public Health in the People's Republic of China released by Hans Consultants, Inc. Of Wuchang, Wuhan, Hubei, China. Compiled by the Ministry of Public Health, this yearbook (English Edition available) contains 16 chapters covering important documents on prevention and treatment of infectious diseases and endemic diseases, maternity and child health care, patriotic health campaign, medical education, research on medical sciences, medical administration, drug administration, frontier health and quarantine, and much more. Other medical guides are also available. To purchase, or for more information, contact Hans Consultants, Inc., 19-1-3, East Section, Xiaohongshan, Wuchang, Wuhan, Hubei 430071, China. Check out their website at <http://China-ebusiness.webjump.com> or e-mail them at <han_con@yahoo.com>.

Spirit of India develops special herbal health travel kit. Due to the many calls about health issues from concerned travelers, a California company, Spirit of India, has developed a special herbal health travel kit. The kit, which comes in a padded fabric case, contains a set of 3 Chinese herbal tinctures, especially formulated for healthy travel: an immune system booster, an amoebic inhibitor, and an antidote to dysentery. The kit is small, lightweight, and, therefore, easy to carry along. Interested travelers can purchase the herbal health travel kit online at <http://www.spirit-of-india.com/healthtips.html> or by calling 415-381-5861.

HIV/AIDS Caregivers Brochure in English and Spanish offered by the Jewish Guild for the Blind. As part of its continuing efforts to educate and inform the country on issues relating to health care and vision loss, the Guild presents its new brochure, "A Guide for HIV/AIDS Caregivers...When Assisting Those with Vision Loss." Filled with drawings and helpful tips for those who interact with visually impaired persons with HIV/AIDS, this guide is available free of charge by contacting The Jewish Guild for the Blind at 212-769-6263.

The *Wilderness Medicine Newsletter* is intended as an informational resource only. Neither the WMN nor its staff can be held liable for the practical application of any of the ideas found herein. The staff encourages all readers to acquire as much certified training as possible and to consult their physicians for medical advice on personal health matters.

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___ Any 10 issues $22.00 ___ Any 1 issue $3.50
___ All 36 issues $65.00

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WILDERNESS MEDICINE INSTITUTE (WMI) BOUGHT BY NOLS....

...AND WHAT DOES THAT HAVE TO DO WITH SOLO?

Recently, the National Outdoor Leadership School (NOLS) of Lander, Wyoming purchased the Wilderness Medicine Institute (WWMI) of Pitkin, Colorado. In light of this news, many people have wondered how–or if–this would affect SOLO since WMI and SOLO have always been considered "sister schools." Well, here's the story...

In the mid-80s, Frank Hubbell & Lee Frizzell (owners and founders of SOLO since 1976) worked with Peter Goth (then owner of the newly organized Wilderness Medical Associates) to develop the Wilderness First Responder course. The first WFR course was held in Florida in 1985 where Frank met Buck Tilton and Melissa "Bugg" Gray, who at that time were Outward Bound instructors and students in that first WFR program. Several months after the course, SOLO was contacted by Buck and Bugg who asked if they could join the SOLO staff and train to become wilderness medicine instructors. For the next five years, Buck and Bugg worked hard to help manage the explosive growth of SOLO. In those days SOLO was offering programs throughout the United States, and quite a few contracts had been established in the West, NOLS among them.

Early on, Buck and Bugg had expressed an interest in eventually locating in the West. This desire meshed well with Frank's and Lee's vision of having a western-based SOLO. So, due to the tremendous investment in time and effort Buck and Bugg had put into SOLO, Frank and Lee offered them SOLO's western contracts and the unrestricted rights to offer programs with SOLO certifications in the West as a way of recognizing and rewarding their contributions.

When Buck and Bugg moved to Pitkin, Colorado and incorporated as the Wilderness Medicine Institute, they did so free and clear of any legal ties to SOLO. They were considered a "sister school" because they offered SOLO-developed and SOLO-certified programs. The recent sale of WMI is the sale of Buck and Bugg's services and company; it is not the sale of SOLO programs. Certifications for WMI courses will now be WMI of NOLS, not SOLO. Both organizations will offer reciprocity for one another's certifications.

UPCOMING CONFERENCES

National Association of EMS Educators 4th Annual Symposium & Trade Show
The Radisson Universal Studios, Orlando, Florida
September 16-18, 1999
Call for information: 412-578-3219

Wilderness Medical Society's Desert Medicine Conference
Doubletree Hotel at Reid Park, Tucson, Arizona
Sept. 28- Oct. 2, 1999
Phone Registration & Information: 800-989-4008

Wilderness Risk Management Conference
Windemere Hotel and Conference Center, Sierra Vista, Arizona
October 14-16, 1999
Call for information: 307-332-1229
<wildrisk@nols.edu>

27th Annual International AEE Conference
Rochester Riverside Convention Center, Rochester, New York
October 28-31, 1999
Call for registration materials: 303-440-8844

13th Annual International Conference on Outdoor Recreation & Education (ICORE)
Snow King Resort, Jackson Hole Wyoming
November 2-7, 1999
Call the Association of Outdoor Recreation & Education (AORE) for details: 864-656-2231

Baltimore Adventure Travel Show
Baltimore Convention Center, Baltimore, Maryland
November 5-7, 1999
Contact Bold Adventures for information: 888-366-3653

4th Annual Women's Outdoor Leadership Conference
Thompson Island Outward Bound Education Center, Boston, Massachusetts
Nov. 12-14, 1999
Conference Voicemail: 617-328-3900x988
Email: WOLConference@hotmail.com

1999 Professional Paddlesports Association Conference & Trade Show
San Antonio, Texas
November 17-20, 1999
Contact the Professional Paddlesports Association for information: 606-472-2205

America Outdoors Confluence Trade Show & Conference
Salt Lake City, Utah
December 2-5, 1999
Call for information: 423-558-3595

Wilderness Medical Society's Winter Wilderness Medicine Course
Beaver Run Resort, Breckenridge, Colorado
February 8-12, 2000
Call for information: 719-572-9255

2000 National Congress on Childhood Emergencies
EMS for Children National Resource Center
Omni Inner Harbor Hotel, Baltimore, Maryland
March 27-29, 2000
Call for information: 202-884-4927

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ATTENTION WFR/WEMT GRADUATES:

NEW PROGRAM AT SOLO

$200 OFF FOR 1999 SOLO WFR/WEMT GRADUATES

OWLS

We designed *Outdoor/Wilderness Leadership School* for the Wilderness First Responder or Wilderness EMT who has realized that prevention of injuries and emergencies may be more desirable than management. The program is oriented toward professional leaders and outdoor enthusiasts who are looking for more information. At the request of our students, we have extracted the leadership component of the renowned ALEC program and tailored it for students that already have the WFR or WEMT background. We derived the leadership principles from many years of contact with thousands of trip leaders who shared their assessments of the strengths and weaknesses of their training and also from the trip-leading experiences of our own staff. Although we will not be teaching more medical information than the WFR or WEMT class that students have completed, those skills will be practiced and reinforced.

Certification: At the end of two weeks, students will receive OWLS certificates acknowledging that the holders have been thoroughly exposed to and has actively practiced the leadership and emergency prevention skills for which SOLO is known. The OWLS certification is awarded to individuals who have met the minimum classroom and field requirements.

Curriculum: The OWLS program will introduce hard skills such as navigation, weather forecasting, group cooking and hygiene, and evacuation. Students will also examine leadership concepts such as differing leadership styles and their applications, client and co-leader confrontation, and wilderness use ethics. Each student will give at least one presentation to the class and will critique each other's presentations. As part of a team, students will cook meals for the class, examine case studies, and navigate orienteering courses. There will also be a number of practical scenarios involving both leadership and medical issues.

Class Format: This ten-day, ninety+ hour curriculum takes place over a two-week period. A typical day consists of a mixture of didactic lecture sections and hands-on skills practice. To optimize learning potentials, OWLS complements these sessions with a variety of mock scenarios and case studies for students to evaluate their own leadership skills. As an extension of these exercises, the class will spend several days outdoors and have one overnight trip. Known for their "open-learning" environments, SOLO courses are taught to audiences with a variety of learning styles.

Prerequisites: The only prerequisite for participation in OWLS is a current WFR or WEMT certification. SOLO recognizes both WMA and WMI of NOLS certifications. Bring your medical skills and an eagerness for new ideas and more practice.

Class Dates: The premiere OWLS course will run from October 11-22, 1999. To register, contact SOLO at 603-447-6711 or 888-SOLO-MED. SOLO WFR and WEMT graduates can receive a $200 discount by presenting a photocopy of their current certification at time of registration.

WILDERNESS FIRST AID & MEDICAL TRAINING OPTIONS

SOLO

PO Box 3150, Conway, New Hampshire 03818
Telephone: 603-447-6711, Mon-Fri 9am-4pm
www.stonehearth.com

Advanced Leadership & Emergency Care
(ALEC)...A combination of WFR, NREMT, WEMT and wilderness leadership skills, survival, rescue and more, this is ideal for the professional outdoor leader.
June 12 - July 21, 2000 Conway, NH (603-447-6711)

Outdoor/Wilderness Leadership School (OWLS)
The leadership module of the ALEC course...WFR or WEMT required as prerequisite.
Oct. 11-22 Conway, NH (603-447-6711)
Feb. 21 - Mar. 3, 2000 Conway, NH (603-447-6711)

Wilderness EMT
Sept. 13 - Oct. 8 Conway, NH (603-447-6711)
Nov. 14 - Dec. 10 Conway, NH (603-447-6711)
Jan. 3-28, 2000 Conway, NH (603-447-6711)
Jan. 3-28, 2000 Nantahala, NC (888-662-1662)
Mar. 6-31, 2000 Conway, NH (603-447-6711)
Apr. 10 - May 5, 2000 Conway, NH (603-447-6711)
May 15 - June 9, 2000 Conway, NH (603-447-6711)

Wilderness First Responder
Sept. 13-21 HIOBS, MD (800-341-1744)
Sept. 13-24 Conway, NH (603-447-6711)
Sept. 20-28 HIOBS, FL (800-341-1744x310)
Oct. 14-22 HIOBS, ME (800-341-1744x310)
Oct. 18-29 AMC, NH (603-466-2727)
Oct. 25 - Nov. 2 Mohican Out. Ctr., NJ (908-362-5670)
Nov. 14-23 Conway, NH (603-447-6711)
Dec. 10-17 Frost Valley, NY (914-985-2291x219)
Dec. 11-19 YMCA Greenville, NC (864-836-3291)
Dec. 13-22 Hulbert Out. Ctr., VT (802-333-3405)
Dec. 15-23 High Country Out., TN (404-814-0999)
Dec. 27 - Jan. 7 Shaver's Creek, PA (814-863-2000)
Jan. 3-11, 2000 Wilderness Adv., VA (800-782-0779)
Jan. 3 -11, 2000 Cornell Univ., NY (607-235-6415)
Jan. 3-11, 2000 HIOBS, ME (800-341-1744)
Jan. 3-12, 2000 Unity Coll., ME (207-948-3131)
Jan. 3-14, 2000 AMC, NH (603-466-2721x109)
Jan. 8-16, 2000 Garrett Coll., MD (301-387-3013)
Jan. 17-28, 2000 Brevard Coll., NC (828-883-8014)

Wilderness First Responder Review
Sept. 11-12 HIOBS, MD (800-341-1744)
Sept. 18-19 HIOBS, FL (800-341-1744x310)
Sept. 23-24 Conway, NH (603-447-6711)
Oct. 23-24 HIOBS, ME (800-341-1744)
Nov. 20-21 Moonshadow, NC (828-497-5741)
Dec. 4-5 Unity Coll., ME (207-948-3131)

Wilderness First Aid/WFR Recertification
Sept. 10-12 Mohican Out. Ctr., NJ (908-362-5670)
Sept. 11-12 Univ. of MD, MD (301-226-4421)
Sept. 25-26 Middlebury Coll., VT (802-443-5264)
Oct. 15-17 Dartmouth Coll., NH (603-646-1607)
Oct. 23-24 AMC, NH (603-466-2727)
Oct. 23-24 St. Michael's Coll., VT (800-654-2614)
Oct. 31- Nov. 1 AEE Conf, NY (603-447-6711)
Nov. 6-7 AMC Boston @ SOLO (978-448-8016)
Nov. 6-7 Green Mtn. Club, VT (802-244-7037)
Nov. 6-7 AMC Worcester, MA (508-478-5186)
Nov. 13-14 Paul Smith's Coll., NY (518-327-6389)
Nov. 20-21 Moonshadow, NC (828-497-5741)
Dec. 4-5 Unity Coll., ME (207-948-3131)
Dec. 11-12 Craftsbury Outdoor Center, VT (800-729-7751)

Wilderness/Rural EMT Module
Sept. 7-11 Conway, NH (603-447-6711)
Nov. 7-11 Conway, NH (603-447-6711)
Nov. 15-19 Hulbert Out. Ctr., VT (802-333-3405)
Dec. 15-19 Conway, NH (603-447-6711)
Feb. 6-10, 2000 Conway, NH (603-447-6711)

Wilderness EMT Part 2
Sept. 27 - Oct. 8 Conway, NH (603-447-6711)
Oct. 25- Nov. 5 Conway, NH (603-447-6711)
Nov. 29 - Dec. 10 Conway, NH (603-447-6711)

EMT Refresher Training Program
Oct. 9-11 Conway, NH (603-447-6711)
Dec. 11-13 Conway, NH (603-447-6711)
Feb. 1-3, 2000 Conway, NH (603-447-6711)
Feb. 29 - Mar. 2, 2000 Conway, NH (603-447-6711)

Wilderness EMT Recertification
Oct. 12 Conway, NH (603-447-6711)
Dec. 14 Conway, NH (603-447-6711)
February 4, 2000 Conway, NH (603-447-6711)
March 3, 2000 Conway, NH (603-447-6711)

NORTH AMERICAN RESCUE INSTITUTE

PO Box 3150, Conway, New Hampshire 03818
Telephone: 603-447-6711 Mon-Fri 9am-4pm

High Angle Rescue Level I
Sept. 25-26 Conway, NH (603-447-6711)

High Angle Rescue Level II
Oct. 1-3 Conway, NH (603-447-6711)

Search & Rescue
Nov. 20-21 Hulbert, VT (802-333-3405)

Avalanche Awareness
Jan. 29-30, 2000 Conway, NH (603-447-6711)
Mar. 4-5, 2000 AMC, NH (603-466-2721x109)

Wilderness Medicine Newsletter
FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES
September/October 1999 ISSN-1059-6518 Volume 10, Number 5

OH, MY ACHING FEET!

By Jeanne Twehous, (W)EMT-B

Nobody takes feet to heart anymore.

Other than to admire some smartly-painted tootsies on occasion, how many of us really give feet a second thought (foot fetishists and podiatrists aside) ? How many of us consider the pedal abuse that we inflict regularly when we cram our feet into too-tight boots and hike over bone-jarring terrain for miles on end or kick steps into hard-packed snow with frozen feet in plastic boots. Other than to whine occasionally about our aching feet, we seem to be totally oblivious to their titanic effort. And the effort is enormous. Did you know, for instance, that you take about 8-10,000 steps in a single day? (That's if you're average--double or triple that statistic if you have an active lifestyle.) And for every step you take you're subjecting your feet to about one to two hundred pounds of pressure, depending on your weight. When you consider that those 8-10,000 steps every day add up after awhile (about 115,000 miles in your lifetime or, in practical terms, a stroll around the globe not once but four times) and those pounds of pressure increase as you gain weight, add a heavy pack, or run instead of walk (running increases the force to 3-8 times your body weight), you may start to realize what gems you've truly got squeezed into those old trailrunners.

Our feet are extremely complex and intricate structures. Each one is made up of 26 bones, 33 joints, 107 ligaments, 19 muscles and associated tendons. They are ingeniously designed to transfer our body weight from our legs to the ground. The arch, with its many bones and joints, provides an elastic, springy connection so that the jar of weight-bearing is mostly dissipated before it reaches the long bones of the leg and thigh; the arch also functions to improve locomotion by adding speed and agility to the gait. The foot itself is capable of rolling from side to side when it contacts irregular surfaces. This capacity allows the leg to remain vertical throughout the motion thus helping us to avoid injury and allowing us to remain upright. The toes enable us to "grip" the surface on which we walk, again, keeping us upright and helping us to move about. When you think about it, feet are quite amazing feats of accomplishment. So why do we take them so much for granted? Probably because, in the grand scheme of things, injuries to our feet are not tragic affairs. Few people actually die from sprained ankles, tendinitis, fallen arches, or blisters. The sucking chest wounds, fractured femurs, and head injuries get all the press because they are life-threatening . . . they're dramatic! How many of us actually *rush* to the scene of a victim of Achilles tendinitis? A sprained ankle? In reality, although those foot-injured patients may not be on death's door, their injuries (as most any injury to the foot) **can** put an end to a trip just as quickly--albeit not as dramatically--as more severe injuries to other body parts.

Like everything in life, the key to keeping your feet healthy is to pay attention to them. Some of the most common maladies of the feet--and the not-so-common--are also the easiest to prevent:

•**Blisters--** it shouldn't need to be said, but . . . stop them before they start. We all *understand* this intellectually. But how many experienced outdoors people still get blisters? Everyone knows the basics: keep feet dry, avoid cotton socks (they keep feet wet) in favor of a synthetic which wicks moisture away, wear two layers of socks (a thin liner under a thicker pair) to transfer the friction, and make sure that boots fit well--not too tight, not too loose. The thing is we just get lazy. We ignore hot spots that tell us that blisters are on their way, or we don't take prophylactic measures (like duct-taping heels or smearing petroleum jelly on feet) even though we know we're prone to blisters. Though we may spend countless hours in the field lecturing clients or friends on how to prevent blisters, we often ignore this advice ourselves and end up having to make that age-old decision--to pop or not to pop. (Pop, of course--with a sterile needle at the base, drain the fluid, clean, and dress.) Do yourself a favor and heed your own advice.

•**Aching arches--** can be caused by pounding when you walk. A heavy pack or walking down a steep hill can add to the pounding, especially if boots are not supportive. According to the experts, the first thing you should check is your form. Although most of us think we know how to walk properly--it's innate, right?--there is a correct form: Lead with your heel and push off with your toe. This sounds simple enough, but if you find your arches are frequently hurting, have someone observe the way you walk. Obviously, if your form is correct and the problem persists, you should see a podiatrist . . . you may need orthotics.

•**Blackened toenails--** caused by your big toe hitting the front of your shoe or boot, usually because of improper fit (a too-short shoe or pressure from the toe box). Toenails that aren't trimmed back can also cause blackened toenails; however, don't cut them too short, or you may end up with

(continued on next page)

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THE AMERICAN ORTHOPAEDIC FOOT & ANKLE SOCIETY GUIDELINES FOR SELECTING APPROPRIATE FOOTWEAR

Shoes should:

- **Be comfortably loose when worn with soft, absorbent socks.**
- **Be shaped like the foot; broad and spacious in the toe area.**
- **Have shock-absorbent soles; a low wedge shape is best; avoid high heels.**
- **Be made of breathable material like canvas or leather; no plastic.**
- **Be comfortable the moment you put them on.**

(Oh, My Aching Feet! – continued)

ingrown toenails. Remember that most people have one foot that's larger than the other. When shopping for shoes and boots, buy them to fit the larger foot and don't forget to try them on with the socks that you'll be wearing with them. Buy shoes in the afternoon if you can as your feet tend to swell a bit during the day, and it's best to have shoes that will fit then. Have your feet measured (while standing) every time you shop to insure getting the proper size. Feet change over time.

• **Skin problems--** sweaty feet can cause rashes and eczema at best, trench foot at worst. Wearing cotton socks, plastic shoes/boots, or tightly fitting shoes/boots may not allow sweaty feet to dry properly. You've got about 250,000 sweat glands in your feet that can excrete as much as half a pint of moisture each day, so, chances are, if your body's working hard, your feet are probably going to be wet. Change wet socks as soon as you can and allow feet to dry out completely (this can also help eliminate smelly feet). More serious consequences can develop when feet are exposed to cold and wet over a longer period of time (12+ hours). Trench foot is the result of decreased circulation to the feet which causes actual tissue damage. Signs and symptoms include pale or mottled skin, numbness and/or tingling, swelling, and, if bad enough, blisters and lesions. Trench foot is easily avoidable by making sure that feet get dry at least once during the day. Keeping a spare pair of socks in your pack so that you can always sleep with dry feet is a good way to help prevent trench foot. A less serious but more common foot problem is athlete's foot, a rash, often between the toes, caused by a fungal infection. Again, good foot hygiene--keeping feet clean and dry--will generally prevent it while anti-fungal creams can help treat.

• **Soft Tissue Injuries--** cuts and scrapes of the foot, like any soft tissue injury, should be cleaned thoroughly and dressed. A laceration of the sole, particularly, should be watched as the pressure put on it from weight-bearing and walking may cause the wound to widen--a problem that may require stitches. Puncture wounds can be a serious matter because of the risk of tetanus, although any infection is possible as these wounds are hard to clean and--by the nature of their location--hard to keep clean. It's a good idea to get a tetanus booster shot every 3-7 years. A good preventative measure is to avoid going barefoot. Even beachcombers and swimmers should wear protective footwear as mollusk shells (or beer cans) can be razor sharp and can easily slice open the soles of feet, despite the fact that the soles are covered with an unusually heavy cutaneous layer. A deep cut that requires stitches can keep you off your feet for awhile. Ideally, going barefoot should be kept to an indoor activity.

• **Musculoskeletal injuries--** stubbing a toe can be more than just a minor nuisance. If swelling, bruising, or pain persists beyond a few days, you may have fractured a toe. Fractures that aren't taken care of--especially of the big (great) toe--can cause long-term foot problems. Stress fractures (also called fatigue or march fractures) of the foot are not uncommon injuries for people that carry big packs over long distances in heavy boots when they are not accustomed to this activity or bump up their running mileage too quickly. (This type of fracture was first identified in the feet of soldiers mobilized during WWII who were required to *march* many miles under the load of heavy packs.) Feet--like any part of the body--respond to overuse with a breakdown in the system. In this case, metatarsals that are not used to that kind of stress simply break under the strain. Pain along the forepart of the arch that increases with weight-bearing and is relieved by rest *may* indicate a stress fracture. Stretching of the arch may cause pain as well. There is usually no history of an injury-causing mechanism other than overuse. Though fractures can certainly be a problem, they are less common than strains and sprains. Remember, there are lots of muscles, ligaments, and tendons in the foot and ankle, and a misplaced step or chronic overuse can cause damage. Any strain or sprain should be treated with rest, ice, compression, and elevation (RICE) and should be seen by a doctor to prevent on-going problems.

• **Achilles Tendinitis--** inflammation of the Achilles tendon which attaches to the back of the heel bone is a fairly common foot/ankle injury in active outdoors people--especially runners. Irritation to the tendon and its sheath results in pain and possible swelling. The cause may be anything from chronic overuse, improper footwear, running on hills or over uneven terrain, or a direct blow. Ice and gentle stretching (a bent-knee stretch) should help minor inflammations; note that trying to run through Achilles tendinitis can convert a minor injury into a severe one that requires surgery.

• **Heel pain (Plantar Fasciitis)--** pain that runs both below and behind the heel often results from an irritation of the tissues, nerves, or bones of the heel. These irritations usually indicate an inflammation of the plantar fascia where it inserts into the heel bone (in more severe cases, a spur may develop on the heel). Runners and other athletes who subject the arch to strain, may develop plantar fasciitis or heel spurs. A direct blow to the heel can also cause spurs as will poorly fitting shoes. For plantar fasciitis, try heel pads or cups and arch support along with RICE, bent-knee stretching, and a change of shoewear. Although rare, surgery may be necessary to remove a spur. According to one physician source, donning cowboy boots may alleviate the problem.

• **Neuromas--** swelling caused by irritation to a nerve can happen anywhere in the body. The most common neuroma--Morton's neuroma--occurs on the bottom of the foot between the toes. A small nerve to the toe becomes pinched between the toe joints, toe knuckles, and the shoe and can result in pain, burning, tingling, or numbness. Treatment may be as simple as a change in footwear, using pads to help alleviate pressure, and avoiding irritating activities. In severe cases, surgery to release or remove the nerve may be required.

• Plantar warts-- the skin's reaction to a chronic virus infec-

(Oh, My Aching Feet! – continued)

tion that invades the sole of the foot through cuts and other breaks in the skin. (Another reason not to go barefoot outside.) Pressure from shoes may cause plantar warts to be painful. Plantar warts can be removed by way of one of several methods: over-the-counter medications (limited effectiveness), physician-prescribed medication (very effective, but slow), or by a physician directly (very quick and effective). Your physican or podiatrist should be consulted for the best method of removal for your foot based on the location, size, and depth of the plantar wart.

• **Activity-Specific problems--** Additionally, certain activities carry their own inherent risks for feet. Winter sports, for instance, can put feet at risk for frostbite. The cold temperatures combined with wet feet (either from sweat or snow soaking through inadequate footwear) and often too-tight and constrictive boots cause a decrease in circulation that promotes freezing of tissues. Make sure your boots fit well and that they are well-insulated and waterproof. Keeping your entire body warm will also help to keep your feet warm, so be sure to wear hats, gloves, and lots of layers. Socks should be woven with an acrylic fiber that wicks away moisture. In extreme temperatures, you may want to consider vapor barrier liners for your feet. Below are other considerations for specific activities:

DOWNHILL SKIING AND SKATING

Properly fitted ski boots and skates are the single most important factor in safe and successful skiing and skating, according to podiatrists specializing in sports medicine. A snug (but not too tight) fit helps to ensure that the pressure exerted by the constant forward motion and lateral movement of skiing and quick turns of skating will not end in injury. Proper ankle support will also guard against sprains, strains, and fractures.

CROSS-COUNTRY SKIING

Cross-country skiing uses different maneuvers than downhill, so it requires different footwear. The cross-country boot is more like a bicycle shoe than a downhill boot. It is bound to the ski only at the ball of the foot and allows up-and-down movement at the heel. Precisely because the heel is constantly moving up and down, it's important to stretch first. Otherwise, you may end up with Achilles tendinitis. The boot itself should not irritate the ball of your foot while skiing; it should fit snugly enough that your heel doesn't slip in the boot but not so tight that it compromises circulation.

WINTER RUNNING

Running on hard-packed snow or icy surfaces may cause runners to change their foot-strike pattern or to land on surfaces with the whole foot (rather than the normal heel-to-toe strike) to increase traction. Both can lead to muscle strain or overuse injuries. There's always the risk, too, of slipping on an icy surface and twisting an ankle. Some runners choose to use spikes slipped over running shoes to increase traction but that can be problematic as well if runners aren't accustomed to using them. Another potential risk with winter running is your feet's susceptibility to frostbite. Many people think that since your feet are constantly in motion while you're running that they can't get frostbite. But feet still sweat (remember those 125,000 sweat glands per foot?), and cold will quickly permeate the thin material of which most running shoes are made. Also, remember that cold muscles take longer to warm up, so always stretch first.

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CYCLING

Next to selecting the appropriate bicycle, proper footwear in cycling should be your most important consideration. Shoes need to have a stable shank to efficiently transfer power from your feet to the pedals. The lack of shank support in sneakers, for instance, allows the foot to collapse through the arch while pedaling. This can cause arch pain, tendon problems, or burning under the bottom of the foot. A rigid shank protects your feet from the stress of pedaling. For most efficient pedaling, shoe shanks should extend fully under the ball of the foot. The use of toe clips on pedals or a clipless system allows feet and pedals to work as a unit to achieve maximum efficiency in transferring power generated by the hips to the foot. Faulty foot positioning on the pedals can also lead to problems--specifically, knee pain. Shoes that limit side-to-side motion can cause knee pain, too, if the knees, feet, and pedals are misaligned. (Keep in mind that riding in too high a gear or too

(continued on page 5)

STRETCHES FOR RELIEVING TENSION AND IMPROVING MUSCLE TONE:

Stand up straight with shoulders back and feet hip-width apart. Hands should be at your waist, knees slightly bent. Shift your weight back onto your heels and lift your toes off the ground. Arch the front of your feet and spread your toes wide apart. Hold for a count of five.

Sitting in a comfortable chair, practice picking up magic markers with your toes. Once you've grabbed the marker, lift your foot 5-6" off the ground and then set the marker down. Do this six times, alternating feet.

Stand on a step with heels facing outward; balls of the feet should be on the step while heels are hanging over the edge. Drop heels until you can feel the stretch. Hold for a count of five.

Lift toes, keeping the ball of the foot on the floor.

Slide foot forward on a step so that the toes hang over the edge. Flex toes downward.

Raise inner margin of foot with the weight on the outer margin. Curl toes down and back in an attempt to make a "fist".

With one foot flat on the floor, rest the heel of the other on the floor and rotate the foot in a circle.

Bent-knee stretch--keep heel flat on the floor and bend knee until you feel the stretch.

With each of these exercises start off doing a few repetitions of each a couple of times a week. Gradually increase the number of repetitions until you can do 10-12 comfortably. From there, continue to do these exercises to maintain muscle tone.

THE JOY OF SOCKS
or
"SOCKS IS MORE THAN A CAT"

by Murray Hamlet, DVM

For many of us, socks are things we can use, after a day or two of wear, to clear out any tent or cabin; or, if we live in the White House, a furry critter to feed at night. Often, we may feel compelled to incinerate them after our foray into the woods. Actually, our socks– or sock system– is integral with our boots and vital to the well-being of our feet. As our feet are our transportation in the backcountry, the sock choice we make can mean the difference between a pleasant or a miserable trip, and in certain circumstances can lead to a litter evacuation.

Socks serve these primary functions: to insulate the foot from heat and cold; to move moisture away from the foot and, thus, keep it dry; to prevent the "shear forces" which cause blisters; and protecting the foot by keeping it a distance from the boot material, known as "stand off."

The different materials from which they are manufactured give socks a variety of properties, some beneficial, some neutral, and some even detrimental. Wool has excellent "stand off" and moisture absorbency, but dries slowly. Nylon is good for strength and form, but can be too hot; often, nylon is woven with wool to add strength. Polypropylene is strong and has well-known moisture transfer properties, known as "wicking." Polyester, too, is a good wicker. Acrylic, on the other hand (or foot), breaks down too easily. Orlon is too soft, reducing the stand off space. Cotton– the most popular choice in socks– is usually the worst choice for hiking, as it is too hydrophilic (water-absorbent), and causes the most blister-producing friction.

Blister prevention is perhaps the most important function of our socks. When dry, socks prevent shearing, the friction between the foot and the sock. However, as the sock gets wet, this force increases and causes the spreading of connective tissue. To protect itself, the body pads the area with a secretion of water underneath the skin, which we call a blister.

Another cause of blisters is excessive heel lift; as the laces over the arch loosen with walking, there is effectively more room in the boot, allowing the heel to lift with each step. The foot can slide backward in the boot, causing pressure and friction in the forward part, resulting in blisters on the ball of the foot. Also, as the heel is lifted past the transverse folds above it, the Achilles tendon will abrade and blister as well.

Heel lift can be prevented by "differential lacing;" lace the boots tightly for four or five eyelets and tie, then lace the remaining eyelets more loosely to accommodate for calf expansion. With the forefoot laced down, the heel should not lift. Boots too long or large can also cause heel lift, where socks "walk down" your leg into the boot. Try a 1/16 or 1/8-inch Poron insole to remedy this problem.

Boots and socks work together to provide proper fit, so a good-quality, well-fitted system is critical. When you try on boots, make sure you are wearing the same sock system you will wear when hiking (or skiing, or climbing), including insoles. Also, wear a weighted pack, as the weight will simulate the extra spread of your foot when you are carrying a full pack. Measure both the length and width of your feet, and take into account that the midsole in quality leather boots will shorten slightly with wear (which is what causes boots to get the classic "rocker" shape). Try the boots on unlaced with your toes jammed into the toe cap; there should be about 1/2 inch of space behind the heel. Similarly, with the heel against the heel counter, there should be a 1/2 inch between the end of the longest toe and the end of the toe box. Lace up the first five eyelets, and walk around to check for heel lift. If the boots cannot be comfortably tightened to prevent heel lift, try the next smaller size. Make sure your toes have plenty of space to wiggle: cramped toes equal blistered toes.

The two-sock system allows your footwear the best opportunity to do their job. Start with a thin,

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(Oh, My Aching Feet! – continued)

much standing on pedals can also cause knee pain. You might need to investigate a few things to determine the source of the pain.) Shin splints may also become a problem for cyclists. Pain to either side of the leg bone is caused by muscle or tendon inflammation. This condition may be related to a muscle imbalance between opposing muscle groups in the leg. Generally associated with excessive foot pronation (as experienced by some runners and an injury found more commonly in runners), shin splints can also happen as a result of wearing improper shoes when cycling that allows the arch to collapse. Proper stretching and wearing appropriate cycling shoes can prevent the problem. Achilles tendinitis in bikers can be caused by improper pedaling, seat height, lack of a proper warmup, or overtraining.

Sesamoiditis is an inflammation of the sesamoids–two small bones found beneath the first metatarsal. Sometimes known as the "ball bearings of the foot," these small bones can inflame or rupture under the stress of cycling. Sesamoiditis can be relieved with proper shoes and/or orthotics. Numbness of the feet can also be a problem for cyclists. It's usually caused by an impingement of small nerve branches between the second and third or third and fourth toes that cause swelling resulting in numbness, tingling, or burning, or sharp shooting pains in the toes. Wider shoes or loosening toe straps or shoe laces often alleviate the problem. Or, try a clipless system if the problem persists.

RUNNING

Injuries common to runners are shin splints, plantar fasciitis, Achilles tendinitis, stress fractures for long distance runners, blisters, and blackened toenails. Most happen as a result of overtraining, bad shoes, or poor terrain (hills, uneven surfaces, concrete surfaces). When injuries occur, then, it's a good idea to look at your training schedule, where you're running, and your shoes. A good running shoe should have a wide, cushioned heel and sole. The toe box should be deep enough to prevent the toes from pressing against the top and long enough to allow free motion and gripping during running. There should be about a thumbnail-length between the longest toe and the front of the shoe. Running shoes should have spring in the forefoot–a good way to judge this is if the forefoot of the shoe tilts up off the ground when the shoe rests flat. The shoe should be flexible but not limp; the heel counter, firm and padded to support the heel. The sole of the shoe should be cushioned enough to absorb much of the shock of running. A soft neoprene insert sole is a great help, too, in absorbing shock. Most running shoes have a built-in arch support which can be helpful in avoiding excessive pronation.

HIKING

Probably the most common malady afflicting hikers is blisters--either due, as mentioned previously, to poorly-fitting boots or downright laziness. Boots should be big enough to accommodate a pair of thick socks (or the two-sock system, if you prefer) and still give you some wiggle room to ensure adequate circulation but they should not be so big that they allow your heel to slip when you walk. Too tight, too loose--both can cause blisters. Sprained ankles can also be a problem when hikers buy boots with inadequate ankle support--especially if they are hiking in boulder fields or other uneven terrain. Though some people prefer the low-cut "sneaker" boots, you should consider what kind of load you'll be carrying and what type of terrain you'll be crossing when buying boots. Some people, too, just have weak ankles and need the extra support that a full boot gives. There are many models of hiking boots available–when you shop, you should know exactly what you'll be asking your boots to do for you. A boot for a day hike in the woods may be quite different than what you need for three-week expedition in the mountains. Also, take your hiking socks with you when shopping so you can get a proper fit with what you'll normally be wearing.

So now, considering all that you're asking your feet to do for you, how do you keep your feet happy? Practice good foot hygiene, for starters. Keep feet clean and dry and toenails properly trimmed, and don't go barefoot. Then look at your shoes and boots. They should be comfortable, practical and well-fitting--meaning they should fit the shape of your foot. Narrow and tight shoes–no matter how fashionable they are or how good they make you look–over time will result in foot problems. According to the American Podiatric Medical Association, only a small percentage of the population is actually born with foot problems--ill-fitting shoes are the major culprit. Shoes should fit comfortably in the store when you buy them. If new shoes need to be "broken in," they were either not properly designed or not properly fitted to your feet. And stay away from what the American Orthopaedic Foot and Ankle Society calls "cruel" shoes: high-fashion shoes with pointy toes, shoes with thin soles, and shoes with high spike heels--all can cause crowding of the toes and/or increased pressure on the feet. These can lead to corns, calluses, bunions, and neuromas for starters with potential for on-going long-term foot problems. Choose function over fasion and your feet will love you for it. And don't forget to pamper yourself. Soak your tootsies in some nice warm water or give them a massage with refreshing pepermint lotion at the end of the day or after a long walk or hike. Remember, you've got four trips around the globe to cover.

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American Podiatric Medical Association
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(The Joy of Socks – continued)

tightly-knit polypropylene or polyester sock (such as Coolmax), about 14 inches high, next to the skin. The liner should have a minimum of nylon. Avoid cotton, orlon, and acrylic.

The outer sock should have a high concentration of wool– 50% or higher– perhaps blended with polyester or polypropylene. A bit of nylon will add to strength and structure, especially in the upper calf. Socks should be densely knit, either a smooth, flat weave (like a Dachstein) or napped (where one side is flat and the other looks fluffy). The smooth side should be next to the skin, which helps the water transference; ironically, this is opposite of the way most socks are sold.

To test for density, stretch the material over your finger and rub. If you can see your finger through the material, it is too loosely knit. Press the material onto a hard surface with your thumb; it should not mat down, but should maintain a 1/8 to 1/4-inch thickness. Also, try the rub test when the material is wet (probably at home, unless you have very progressive retailers). It should hold up the same as when dry. You will probably notice that most ragg socks are too loosely knit. A "fish mouth" closure at the toe, if you can find it, will fit better.

As with boots, socks should be broken in; wet the sock and pull the toe seam out flat, or pound it out flat on a soda bottle. Wash in Woolite and fluff in a cool dryer.

Often a last minute, hastily-chosen item, socks are a critical component of our backcountry transportation system. A little thought and effort beforehand can prevent discomfort and make your backcountry trip something to remember for more than your blisters.

Editor's note: This article has been reprinted from the January/February 1996 issue of the Wilderness Medicine Newsletter. Dr. Hamlet's article continues to be highly requested and a frequent topic of discussion.

Wilderness Medicine Newsletter
FOR THE RECOGNITION, TREATMENT AND PREVENTION OF WILDERNESS EMERGENCIES

ALLERGIC REACTION KITS RECALLED

Update from the Associated Press, New York

American Home Products is recalling more than 500,000 allergic reaction kits in North America because the epinephrine syringes in them may not work. Epinephrine, which increases blood flow and helps restore breathing, is used to treat acute asthma attacks or severe allergic reactions to insect stings or certain foods.

For American Home, which faces legal problems from its diet drugs and Norplant contraceptive device, the recall is just the company's latest setback.

American Home's Wyeth-Ayerst Laboratories division said it is voluntarily recalling Epinephrine injection, USP1:1000 in 1 mL Tubex syringe. The company said it's taking the action after observing discolored samples in routine quality-control tests. A few of the discolored samples were found to be less potent than they should be, which could pose a potential health hazard for those who use them to battle the allergic reactions.

"We encourage those who depend on these kits to err on the side of caution," Phillip de Vane, North American medical director for Wyeth-Ayerst, said in a statement. He encouraged consumers to contact their pharmacists and other health care providers to determine whether their allergy kits are being recalled or have lost potency.

The recall includes the Insect-Sting Treatment Kit packaged and distributed by Derm/Buro Inc.; Anaphylaxis Emergency Treatment Kit packaged and distributed by Bayer Corporation as Hollister-Stier Ana-Kit; and Ana-Guard, which was packaged and distributed by Bayer. All the kits sold via prescription cost around $40.00.

About 450,000 Ana-Kits and 55,000 Ana-Guards are being recalled in the United States and Canada, said Kathleen Bauemschmidt, spokeswoman for Hollister-Stier Laboratories of Spokane, Washington. Bayer sold its allergy kit manufacturing business to Hollister-Stier in June.

It was unclear how many kits were being recalled by Derm/Buro.

The number of kits being recalled represents about 25 percent of all allergic reaction kits on the market, Bauemschmidt said. Consumers can call Wyeth-Ayerst at 1-800-999-9384. Replacement products are available through doctors' offices and pharmacies.

Overall, shares of American Home have fallen more than 40 percent this year because of a rash of problems, though shares rose 6 1/4 cents to $41 in New York Stock Exchange trading Tuesday.

In August, a jury awarded $23 million to a Texas woman who claimed the company failed to warn her about the dangers of diet drugs, Redux and Pondimin, also called fen-phen. Hundreds of lawsuits are now pending nationwide against the company stemming from the diet pills' potential to cause heart-valve problems.

The company this summer suspended shipments of rotavirus after it was linked to bowel obstruction in 32 infants. And last year, American Home recalled a painkiller, Duract, after it caused fatal liver problems.

With the latest recall, Derm/Buro Insect-Sting Kits with the lot numbers, 0397, 0497, 0597, 8141, 11464, and 13239, should be returned to the hospital, clinic, or pharmacy where they were obtained. The numbers are found on the front of the label of the kit. The products were distributed between June 1997 and February 1999.

Ana-Kits with lot numbers AK344 through AK363 and lot AK366, and Ana-Guard with lot numbers G00196 through G00220, and lots G00222 and G00223 should also be returned. Ana-Kit lot numbers are on the front label of the package, and Ana-Guard lot numbers are on the top panel of the box. They were distributed by Bayer between April 1997 and April 1998.

Only those specific lots of the product are affected by the recall, American Home said.

The Wilderness Medicine Newsletter is intended as an informational resource only. Neither the WMN nor its staff can be held liable for the practical application of any of the ideas found herein. The staff encourages all readers to acquire as much certified training as possible and to consult their physicians for medical advice on personal health matters.
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Wilderness Medicine Newsletter

FOR THE RECOGNITION, TREATMENT, AND PREVENTION OF WILDERNESS EMERGENCIES

November/December 1999 ISSN-1059-6518 Volume 10, Number 6

BREATHING HARD IN THE BACKCOUNTRY

By Sue Barnes, (W)EMT-B

The air was clear and cold as the skiers glided through the hardpacked snow. The view of the surrounding mountains was spectacular as the group of teens worked together to pull the sleds over the last rise. The sweet feeling of success on everyone's part was interrupted by shouts from the head of the line. One of the group members was leaning over with her hands on her legs, trying desperately to take in a good breath.

With few exceptions, there is little else that creates such anxiety for both a patient and a caregiver in a backcountry setting than the inability to breathe. The good news is that backcountry traumas leading to respiratory emergencies are (fortunately) few and far between. However, there are medical conditions that can create breathing difficulties for those venturing into the wilds. This article will review some of those medical conditions, their causes, signs and symptoms, their treatment, and preventative steps.

First, some basic anatomy and physiology. Air passages in the nose (nasopharynx) and mouth (oropharynx) join together to form the pharynx. The pharynx then divides into the esophagus (which brings food to the stomach) and the trachea. The epiglottis prevents the entry of food into the trachea (and ultimately the lungs). Just below the epiglottis is the larynx (voice box), at the superior portion of the trachea. The trachea then runs along the anterior surface of the neck, (it can be felt just beneath the skin), into the chest. The trachea divides into right and left air tubes, called bronchi. Each bronchus enters its respective lung, branching into smaller and smaller air tubes, the smallest of which are bronchioles. At the terminus of the bronchioles are alveolar air sacs. It is here that the exchange of oxygen and carbon dioxide takes place between the single-celled walls of the alveoli and lung capillaries. When looking at medical conditions that affect the respiratory system, it is often divided into the upper and lower respiratory tracts. The upper airway includes the naso– and oropharynx to the epiglottis while the lower airway begins with the larynx and includes the trachea, bronchi, and all parts of the lungs.

The respiratory center in our brain controls the rate and depth of our breathing. This center will respond to either too little oxygen or too much carbon dioxide in the body. When either situation exists, the brain causes the diaphragm and intercostal muscles to contract. Air rushes in to the lungs to equalize the pressure created by the flattening of the diaphragm and the expansion of the chest wall. Thus, we breathe. Exhalation is passive; as the intercostal muscles and diaphragm relax, air escapes the lungs with ease, until the air pressure in the lungs and the outside air become equal. Once there is a build-up of carbon dioxide (or a lack of adequate oxygen), the whole process is repeated. That is, unless there is an interruption in the process.

HISTORY

Try to familiarize yourself with program participants and their individual medical histories prior to starting a trip. Knowing any preexisting conditions, allergies, and medications prior to someone developing a problem can go a long way toward keeping yourself calm during a respiratory emergency.

When assessing anyone in respiratory distress, remember your ABC's. If a respiratory emergency arises and the patient is able to speak, ask him if this has ever happened before, and, if so, was it similar and how was it treated. Also, ask him to describe the difficulty, when it began, what makes breathing better, what makes it worse, is there pain associated with the difficulty, and if so, where. Check vital signs. What is the skin color (blue?), temperature (fever?) and moisture. (clammy?). What is the level of consciousness anxious, restless? What is the breathing rate, rhythm and depth? Is there coughing, wheezing, rhonchi, or crackles? Is the pulse elevated, weak?

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While doing a physical exam, listen to breath sounds at the mouth and chest wall. If you do not have a stethoscope, place your ear over the chest wall in the same places you would put a stethoscope. Observe the rise and fall of the chest, noting any unusual or uneven movement of the chest wall.

By fully assessing your patient and gathering all information, you will have the greatest opportunity to determine the nature of the breathing difficulty and the appropriate actions necessary for relief.

ASTHMA

Asthma is a chronic inflammatory disease of the airways and is rapidly on the rise in the U.S., particularly in children. The reason behind this rise is not completely known. What is clear is that asthma is manageable, and those with the disease can still participate in outdoor adventures with proper care and preparation.

With asthma, an individual's airways are sensitive, swollen, and constricted. An asthma attack may be triggered by cold, dry air, exercise, stress, an upper respiratory infection, or inhalation of various allergens such as pollens, molds, dust mites, animal dander, or smoke. An asthma attack may be mild to severe and may start suddenly or may take a long time (even days) to develop. During an attack, the airway swells, and the smooth muscles in the airway tighten. This causes the airways to narrow, making breathing difficult. At the same time, cells in the airway make more mucus than normal, and this mucus is thick and sticky. Because the bronchioles are so narrow to begin with and swelling makes them even more narrow, the mucus can create plugs in the bronchioles.

An individual experiencing a mild or moderate attack may start to feel tightness in the chest; she may also be coughing up mucus, have a feeling of restlessness, or have difficulty sleeping. The patient may experience very short periods of breathlessness; and may be wheezing or making whistling sounds while they are breathing.

During a severe attack the patient will be wheezing audibly as air escapes through very narrowed air passages. Most people will assume a position of sitting or standing up and leaning over (tripodding), which helps them to breathe better. The patient will have difficulty talking, and lips and nail beds will become a bluish color from lack of sufficient oxygen. Neck muscles may become tight as the patient breathes, and the skin around the ribs may get sucked in (particularly with children). The chest may appear overinflated, as more and more air becomes trapped in the alveoli. An ever-increasing difficulty in breathing causes many patients to panic and forget where their medication is located.

Asthmatics may carry a variety of medications to manage their asthma, namely bronchodilators, which open the air passages by relaxing the bronchial muscle and antiinflammatory agents, which reduce the swelling inside the airways. It is essential to act quickly to bring an asthma attack under control. In an emergency situation, the patient will need to use a fast-acting, inhaled bronchodilator such as albuterol (Proventil, Ventolin) to help open the airways. Try to keep the patient calm (that goes for you, too!) If the patient cannot find his inhaler, or does not have one, ask him to attempt pursed lip breathing. By puckering the lips during exhalation, back pressure is created inside the lungs, opening the bronchioles enough to allow air to escape from the alveolar sacs. If left untreated, asthma has the potential to kill by completely occluding the airway. When the use of a bronchodilator and/or pursed lip breathing is ineffective and the patient's airway is severely compromised, you may need to administer Epinephrine (0.3cc at 1:1000 concentration for adult, 0.15cc at 1:1000 concentration for children) in the same dose as for an anaphylactic reaction. Once the patient is able to breathe, give the inhaler. (Do not give asthmatics antihistamines.)

As mentioned above, there are many drugs used in the management of asthma. A number of antiinflammatory agents (steroids) such as prednisone or triamcinolone acetonide (Asthmacort) are taken on a daily basis via a metered dose inhaler. Anti-inflammatory agent use helps to reduce the swelling in the air passages and minimize the chances of an asthma attack. In another type of treatment, medications such as cromolyn sodium (Intal) are used to inhibit allergens from triggering bronchospasm. Please note that these medications are used for longterm effects and will not assist the patient in a crisis situation. As with the use of any medication, be sure you assist in the administration of the right drug to the right person for the right reason.

Other measures to help prevent an asthma attack from occurring in the backcountry include: avoiding contact with allergens which cause a reaction; covering the mouth and nose with a scarf or bandana to prewarm the air in cold weather; maintaining emotional safety; staying well-hydrated; taking medications as prescribed by a physician; and beginning the trip in good physical condition.

THE SOUNDS OF LABORED BREATHING

WHEEZING - a whistling or sighing sound made as air passes through narrowed passageways. Indicates that the problem is in smaller airways of the lower respiratory tract. This is generally heard upon exhalation.

STRIDOR - a harsh, high-pitched sound indicating significant swelling or an obstruction in the upper airway.

CRACKLES - what was historically referred to as "rales" or "rhonchi," modern medicine now terms as crackles. These breath sounds can be low-pitched sounds with a snoring quality or fine breath sounds similar to the sound of hair being rubbed through fingers that are placed close to an ear. In either case the sound is created because of fluid or other secretions are in the air passages.

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PNEUMONIA

Pneumonia is an infection in the lungs caused by a virus, bacterium, or fungus. The infection causes the alveoli and spaces between to become filled with pus and sometimes blood, inhibiting the transfer of oxygen into the bloodstream. Depending on the cause, pneumonia may develop quickly, or over the course of a few days. The patient often has an existing upper respiratory infection (such as a cold) and will develop a productive cough with thick yellowish, greenish, or blood-tinged sputum. This cough may or may not be accompanied by difficulty breathing. A fever (101F or higher) and chills will be present. Pulse and respiratory rates increase, and the sound of crackles may be heard with a stethoscope initially, and possibly unaided as the infection progresses. If a stethoscope is available, you may also note diminished breath sounds in the affected area of the lung. The patient may complain of chest pain on the affected side. In severe cases, she may be sweating profusely, and show signs of cyanosis.

Clearly, this individual needs to be evacuated from the backcountry to seek medical treatment. If capable of walking, she should do so, as it will expedite the evacuation process. Continue to monitor vitals during transport and keep the patient well-hydrated. (Fluids will help prevent sputum from plugging the lungs.) If available, provide oxygen as needed. With regards to prevention, keep an eye on anyone who develops a cold or other upper respiratory infection. Oftentimes staying well-hydrated and getting plenty of rest is all someone will need to quickly get her on the road to recovery. Watch for signs of a worsening problem: developing a high fever or thick, colored sputum, and be prepared to act accordingly. Remember to encourage coughing to help expel the fluid in the lungs.

HYPERVENTILATION SYNDROME

Hyperventilation Syndrome is a common and benign form of respiratory distress created by a psychological stress. An emotional reaction, pain, physical exertion, etc. may cause this reaction. The stress makes the individual breathe faster and/or deeper, blowing off much of the carbon dioxide in the body. Excessive loss of CO_2 from the blood makes the blood more alkaline. Alkalosis interferes with the normal function of muscles and nerves, causing coldness, numbness and tingling of the hands, feet, and around the mouth. The patient will experience lightheadedness and increasing shortness of breath. This alarms him and causes him to breathe even faster. Blueness and spasms of the hands and feet (carpopedal spasms) may develop as alkaline levels increase. Rapid breathing causes excessive use of chest muscles, which may cause a slow onset of chest pain. Continued hyperventilation will lead to the constriction of blood vessels in the brain, and the patient will faint. He will revive on his own once carbon dioxide levels have returned to normal. (If the patient passes out, he may stop breathing for up to 30 seconds before CO_2 levels improve.)

Treatment of Hyperventilation Syndrome must include a primary assessment to deal with immediate life threats. Once it has been determined that the patient is suffering from hyperventilation, it is very important to calm him. Speak slowly and clearly, looking into his eyes. Try to breathe with the patient, starting at his breathing rate and gradually slowing that rate down to a more reasonable pace. If this is not possible, ask him to try and hold his breath for short periods of time, increasing that time as you go along to allow for the increase of carbon dioxide in the system. Once the patient's breathing returns to normal, treat the underlying cause of the attack. Prevention includes being sensitive to the emotional needs of the individual and providing emotional support in an appropriate manner as is necessary.

SPONTANEOUS PNEUMOTHORAX

Spontaneous Pneumothorax is created by a congenitally weakened area in the lung which spontaneously collapses, causing air to leak from the lung into the surrounding pleural space.

The highest incidence of spontaneous pneumothorax occurs in tall, thin, muscular adolescent males and men in their early twenties. Often the patient may have recently gone through a growth spurt. The pneumothorax may be spurred on by playing sports or severe coughing, though signs and symptoms often occur when the patient is at rest.

The patient will have a sudden onset of shortness of breath and chest pain. There may be decreased breath sounds on the affected side. He may also have a previous history of a spontaneous pneumothorax. An individual suffering from a spontaneous pneumothorax needs to be seen by a physician. He may be capable of walking, but if not, place him in a position of comfort (usually sitting up). Give oxygen if available and assist with ventilations as needed. Since a spontaneous pneumothorax is caused by a congenital defect, there are no backcountry measures that would prevent its occurrence.

In general, treatment for someone with difficulty breathing should include:

- Keeping the patient, yourself, and those around you calm.
- Maintaining an open airway and monitoring vital signs.

GENERAL TREATMENT FOR SOMEONE WITH DIFFICULTY BREATHING SHOULD INCLUDE:

- **Keeping the patient, yourself, and those around you calm.**
- **Maintaining an open airway and monitoring vital signs.**
- **Assisting in ventilations as needed by the patient.**
- **Giving oxygen to anyone in respiratory distress, if it is available.**
- **Treating the cause of the problem, and evacuating the patient to the nearest medical facility if that is not possible.**

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HANTAVIRUS PULMONARY SYNDROME

Hantavirus Pulmonary Syndrome (HPS) was first described in 1993, when several people at a Navajo nation in New Mexico died from respiratory failure associated with the disease. The virus has been found primarily in the Southwestern U.S. (particularly Arizona, Colorado, New Mexico and southern Utah), but it has been reported in a total of 28 states. It is carried principally by the deer mouse, which then sheds the virus in its feces, urine and saliva. It is believed that humans take in the virus when saliva or excreta are inhaled as dust, absorbed through the mucous membranes of the eyes, via skin cuts/abrasions, or possibly through inadvertent ingestion of the material. Humans do not appear to infect other humans with HPS.

The hantavirus has an incubation period of between one and six weeks, typically two weeks. The exposed individual develops a fever with chills, muscular aches, headache, possibly nausea and vomiting, and malaise. Within a few days the symptoms worsen and are accompanied by coughing and shortness of breath. Acute respiratory distress and respiratory failure quickly follow as the lungs fill with fluid. People have died within two to ten days after onset of symptoms.

Ribaviren, an antiviral agent, is being tested to determine its usefulness in treating HPS, but currently there is no cure for the infection caused by the hantavirus. Chances of survival are increased through use of a respirator, so immediate evacuation to a medical facility is vital. As with any patient in respiratory distress, monitor vitals, maintain an open airway, assist with breathing as needed, and give oxygen if available.

Avoiding areas where rodents have burrows or nests may prevent the contraction of the hantavirus. Use a tent with a floor, or use a ground tarp that extends at least two to three feet beyond the sleeping bag. Store all food in an area inaccessible to rodents. Properly dispose of any trash or garbage as quickly as possible to minimize the risk of rodent visitors.

- Assisting in ventilations as needed by the patient.
- Giving oxygen to anyone in respiratory distress, if it is available.
- Treating the cause of the problem, and evacuating the patient to the nearest medical facility if that is not possible.

Many medical respiratory emergencies may be prevented through a combination of the following: keen observation by the group leader for signs of excessive physical or mental overexertion; appropriate use of medications by individual participants; and the employment of necessary measures to prevent environmental factors from affecting the health and welfare of all trip members.

Now go out and play hard, have fun, and breathe easy in the backcountry!

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FOR MORE INFO....

The American Lung Association
8005864872, or www.lungusa.com

Center for Disease Control
8882323228, or www.cdc.gov

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PEOPLE WITH PRE-EXISTING CONDITIONS GOING TO THE MOUNTAINS

By: J.S. Milledge (UIAA Medical Commission)

INTRODUCTION

This paper is intended for doctors and interested non-medical persons. As more and more people are taking holidays at altitude and many of them are elderly, there are going to be a number suffering from chronic medical conditions. How should those who are planning trips to altitude be advised?

EFFECT OF ALTITUDE AND THE MOUNTAIN ENVIRONMENT

At altitude the low barometric pressure means that the oxygen inhaled is at a lower pressure than at sea level. This in turn means that the oxygen transport system of the body is operating under difficulties, and any chronic condition which affects this system will make matters worse. Thus diseases of the cardio-respiratory system are especially likely to interfere with performance at altitude.

Apart from the effect of altitude itself, the mountain environment poses other hazards. The great ranges are situated mostly in under-developed countries and in wilderness areas where gastro-intestinal problems are common and medical help uncertain. Altitude holidays usually involve quite strenuous exercise and put a strain on the joints, especially knees, hips and backs. Finally, the different culture and lifestyle of such a holiday may impose psychological stresses which may be too much for some people unused to the difficulties and privations of such a trip.

There is also the consideration that on an expedition or trek the aphorism, "No man is an island," applies with greater force than in normal urban life. One member's illness affects the whole team and may even imperil the safety of other members. Therefore, it is ethically imperative that if a person knows he/she has some pre-existing condition which might affect his performance, he should make it known, at least to the leader or medical officer (if there is one).

SPECIFIC CONDITIONS

A few of the most common conditions are discussed here. Further reading is suggested at the end of the paper.

Respiratory

Conditions such as chronic bronchitis, emphysema (COPD) and other lung conditions which cause breathlessness at sea level are obviously going to cause even more shortness of breath at altitude. However asthma sufferers usually find they have less trouble at altitude. Although they may be breathing cold, dry air, which can be a cause of bronchospasm, because of the absence of the allergens in the air at altitude, in the majority of cases, they have less wheeze. The increased sympathetic drive and adrenal steroid output may also help. They should, of course, take a good supply of their usual medication.

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Cardiac Conditions

Clearly patients with symptomatic heart conditions (e.g. unstable angina, heart failure, etc.) should not go to high altitude, but patients with systemic hypertension controlled by medication seem not to be at increased risk nor do patients following successful coronary bypass surgery or angioplasty who have good performance at sea level. Patients with angina controlled by drugs should certainly consult their cardiologist before considering an altitude trip. The question of whether altitude is a risk factor in the aetiology of coronary occlusion in previously asymptomatic people is unknown, but the best evidence is that it is not a significant factor.

Blood Disorders

Patients with anaemia will be more short of breath at altitude, and some women who may have low iron stores would benefit from taking iron tablets when going to altitude. But for the majority of people these and vitamins are unnecessary. Patients with bleeding or clotting problems should not go to altitude. Although the effect of altitude on the clotting system is debated, the remoteness from medical help is reason enough to advise caution. Similarly, patients on anti-coagulation therapy for any reason should probably be advised to choose a holiday where medical help is readily available. Patients with sickle cell disease also should not go to altitude. Even in those with sickle cell trait there is a 20-30% chance that altitudes above 2000 m may trigger a crisis. Aspirin is taken by a number of people going to high altitude with the idea of reducing any risk of thrombotic problems due to the high haematocrit of altitude. We have no evidence either way for this practice, but the usual precautions in taking aspirin (or any NSAIDs) must be stressed.

Endocrine Disorders

Diabetes Mellitus

Altitude itself probably does not have any effect on diabetes, and many diabetics have enjoyed holidays in the mountains. However, the increased exercise is likely to reduce the insulin requirements, and, if this is not allowed for, hypoglycemia is a risk. Both the patient and companions need to be aware of the risks of hypo- and hyperglycemia and know how to recognize and treat these problems in the absence of medical help.

Steroid Therapy

Patients who have been on steroid replacement therapy for adrenal failure should increase their steroids on going to altitude to cover the increased requirement due to the stress of altitude.

Gastro-Intestinal Disorders

The most common medical problems amongst trekkers are usually diarrhoeal disorders. And anyone with a chronic pre-

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Feb. 23-27	**Wilderness & Travel Medicine** Snowbird, Utah 800-880-5738
March 3-5	**Mid-South Regional AEE** Saint Benedict, Louisiana rob@mcbs.org
March 10-12	**Heartland Regional AEE** Williams Bay, Wisconsin owls@idcnet.com
March 16-19	**Southeast Regional AEE** Mount Berry, Georgia mking@berry.edu
March 22-25	**WMS Travel & Environmental Medicine** Santa Fe, New Mexico www.wms.org
March 22-26	**EMS Today** Orlando, Florida 800-266-JEMS
March 24-25	**American Camping Association** Manchester, New Hampshire camp@acane-camps.org
March 24-26	**Mid-Atlantic Regional AEE** alxmill@hotmail.com
March 31-April 2	**West Regional AEE** Sanger, California dana.erickson@autodesk.com
April 7-9	**Rocky Mountain Regional AEE** Santa Fe, New Mexico Lhiester@aol.com
April 14-16	**Northeast Regional AEE** Colebrook, Connecticut ymca.met.hgd@snet.net
June 1-3	**EMS Magazine Exposition** Charlotte, North Carolina 877-EMS-EXPO

(Pre-Existing Conditions... – continued)

existing condition of this sort, e.g. Crohn's or ulcerative colitis should probably not plan this sort of holiday. Peptic ulcer should be treated before going into the high mountains. Similarly, conditions such as hemorrhoids, fissure in ano, etc. considered trivial at sea level can cause real problems in the mountains and need to be dealt with before the trip.

Neurological Conditions – Migraine

Many migraine sufferers find that ascent to altitude triggers an attack, often a severe one with neurological symptoms. It can be difficult to distinguish this from AMS or even HAPE although the headache of AMS is not usually unilateral, as it is typically in migraine. Migraineurs should take a supply of the drugs that usually help them and use the drugs at the first sign of an attack. If in doubt about the diagnosis, especially if symptoms persist after using drugs which normally relieve symptoms, the patient should be treated as for AMS or HACE.

Cerebro-vascular Disorders

Patients with known or suspected cerebro-vascular problems such as TIAs, previous strokes, or carotid artery stenosis should probably be advised against altitude travel because of the risk of thrombosis with the high haematocrit.

Epilepsy

Contrary to what might be expected, there is no evidence that altitude increases the risk of an epileptic seizure so patients whose epilepsy is well-controlled can enjoy holidays at altitude with the same confidence as would apply to hill walking at low altitude.

Joints and Ligaments

A trek, particularly with long down-hill sections, will reveal even slight weaknesses in weight-bearing joints. Again, this is not due to altitude itself and would-be trekkers can test themselves out at low altitude. Non-steroidal anti-inflammatory agents are valuable in this area, and a good supply of various drugs should be packed. Anyone suffering joint pain should start NSAIDs early (taken on a full stomach) and in adequate dosage rather than being heroic about the pain.

ENT and Dental Problems

Nasal polyps which interfere with breathing should be dealt with prior to the trip as should any outstanding dental problems. Dental abscesses seem to be very common at altitude, possibly as a reflection of reduced immune function. They can usually be kept under control by antibiotics until the traveler returns home.

Mental Outlook

For the majority of people, venturing into the high mountains is a wonderful experience even if, at times, the conditions are harsh and uncomfortable. Most have graduated to this experience via family trips into the hills, short camping trips near home, hill walking, etc. But some suddenly get the idea that they want to make some big trip with no previous experience and have quite unrealistic ideas of their own performance. Sometimes all works out well, and the spontaneous adventurers adapt to what is a very different lifestyle with no problem. Others are clearly psychologically quite unsuited to this experience and become psychiatric casualties, to the distress of themselves and their companions.

SUMMARY

An account of this sort inevitably focuses on the gloomy side. Many people with chronic conditions can nevertheless enjoy holidays in the mountains. The important thing is to assess the situation realistically, take advice, be honest with oneself and one's companions, and tailor the trip to one's abilities.

FURTHER READING

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